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THE MECHANISM OF CROSS INFECTION OF WOUNDS IN HOSPITAL BY HÆMOLYTIC STREPTOCOCCI

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IN previous papers^{1, 2, 3} it was suggested that hæmolytic streptococcal infection of accidental wounds is generally exogenous in origin, the organisms being derived in a variety of ways from the nasopharynx of someone who has access to the wound or from already-infected wounds in other patients in the vicinity. The methods by which the organisms may travel from the nasopharynx to a wound have been studied⁴ but the routes and methods by which cross infection in hospital wards may take place do not appear to have been investigated in any detail, although Fleming and Porteous⁵ and Miles *et al.*⁶ have produced very conclusive evidence that it can occur.

It is probable that such hospital infection takes place by way of two main routes, of which the first is the transfer of organisms on some object such as the hands of the dresser or his instruments which without proper intermediate sterilization subsequently touch a clean uninfected wound, and the second by transport of infected particles by air currents over the intervening space between the patients.

This paper records observations which shed further light on the mechanism by which such cross infection in hospital may take place. Complete surveys of the skin and bedding of patients with infected wounds have been carried out which indicate that the organisms are present on many areas of the patient and his surroundings usually considered to be free of them. For this reason, the chances of conveying infection by hands or instruments are higher

than is usually supposed. At the same time, observations on the pollution of the atmosphere around such patients show that even small wounds may cause contamination of the air with correspondingly high chances of causing infection in other wounds by air-borne transport of infected particles.

METHODS

Examination of the skin of the patients.—Ordinary straight throat swabs moistened in sterile saline were rubbed over the areas to be sampled. They were brought to the laboratory immediately and plunged into infusion broth containing 1/500,000 gentian violet⁷ and 10 per cent horse serum in which they were incubated for 24 hours. A loopful of the resultant culture was then seeded on to sheep's blood agar plates and incubated anaerobically in a McIntosh and Fildes jar for another 24 hours. Any hæmolytic streptococci found were then isolated and stored on blood agar slopes.

Swabs from the nose, throat and saliva were treated in a similar fashion except that they were incubated in 10 per cent horse serum without gentian violet.

Sampling of the bedclothes.—Swabs were moistened in sterile saline and rubbed over the surface of the material, the area sampled in each case being: pillow, approximately a six-inch square on each side of patient's head; upper sheet, approximately one square foot in vicinity of wound and across the top of the sheet; lower sheet, an area about two feet long, along each side of the patient; bedspread, an area across the top of the spread approximately 6 inches by 18 inches.

On return to the laboratory these swabs were treated in the same way as the swabs taken from the skin.

Air contamination.—Blood agar plates were exposed for two hours during the afternoon when the ward was quiet. These were placed horizontally at various levels, never more than 3 feet from the floor, about the patient's bed and further out in the ward, their disposition depending on the layout of the ward. As a rule, 8 to 10 plates were exposed, 5 near the bed and the remainder further away. The plates were then incubated anaerobically for 24 hours in a McIntosh and Fildes jar and all colonies of hæmolytic streptococci which appeared counted and purified by plating. They were then stored on blood agar slopes for further study.

Further study of the hæmolytic streptococci isolated.—An attempt was made to determine the type of all strains isolated. Slide agglutinations were employed using sera prepared by our colleague, Dr. Frieda Fraser, to whom we are deeply indebted. In the case of strains

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from wounds, nasopharynx, bedclothes or the person of the patient, only one colony was usually studied, although in several instances more than one colony was picked for purposes of control. In the case of the strains isolated on blood agar plates from the air, every colony was typed. This, in most instances, meant determining whether each colony gave agglutination with sera of the same type as that of the strain from the wound. If this did not occur, their actual type was, if possible, determined.

PATIENTS STUDIED

Details of the type of infection, nature of discharge, etc., of the patients studied in this communication are given in Table I. These details are rendered necessary because of the

RESULTS

As already mentioned, it may be assumed that if transfer of infection from case to case occurs, it will be by one of two routes: (1) on the hands, instruments or other objects used for septic cases coming into contact with clean uninfected wounds; (2) air-borne transfer of organisms over the intervening space. These will be discussed separately.

1. TRANSFER OF INFECTION BY INSTRUMENTS HANDS OR OTHER OBJECTS

It is generally assumed that the organisms in

TABLE I.
TYPE OF WOUND AND DISCHARGE IN ALL THE PATIENTS STUDIED

Patient	Lesion	Size and location	Amount and type of discharge	Treatment Local
H.A.Y.	Infected laceration.	6" on forearm.	Moderate Serosanguineous	Dry heat (cradle) and saline baths.
E.L.L.	Infected compound fracture.	1" into joint just above knee.	Copious Serosanguineous	Dry dressing changed P.R.N.
B.R.O.	Incision into pelvic abscess.	8" midline, lower abdomen.	Copious thick pus	Dry dressing changed P.R.N.
F.I.T.	Ulcers, 3.	1 cm. diam., 2 buttocks, 1 foot.	Scant Serosanguineous	Dry dressing changed B.I.D.
C.A.R.	Infected burn.	Mid thigh to mid. lower leg.	Moderate Serosanguineous	Tannic acid coagulum removed saline compresses.
C.V.H.	Cervical adenitis.	Neck, 1" incision.	Profuse creamy pus	Hot saline compresses.
C.U.P.	Suppurative arthritis.	Knee. Two 6" incisions.	Profuse creamy pus	Moist compresses under heat cradle.
M.U.R.	Varicose ulcer with cellulitis.	Ankle, 2-3" diam.	Moderate Serosanguineous	Dry heat cradle.
H.U.N.	Infected blister with lymphangitis.	1 cm. diam., palm of hand.	Scant Serosanguineous	Saline baths and dry heat cradle.
W.O.L. 1	Otitis media.	....	Profuse creamy pus	Boric irrigation and dry dressing.
2	Otitis media and mastoidectomy.	3" incision.	Moderate creamy pus	Packing in wound covered by dry dressing.
P.O.W.	Tenosynovitis.	Finger. 2-1" incisions.	Moderate Serosanguineous	Saline hand bath and dry heat cradle.
McA.	Infected pre-patellar space.	Knee. 2-2" incisions.	Moderate creamy pus	Moist compress and heat cradle.
H.A.M.	Cellulitis with ulcers.	2 ulcers, 1" diam., right leg.	Moderate creamy pus	Dry heat cradle.
D.E.A.	Infected blister.	Dorsum foot 1" diam.	Scant creamy pus	Dry heat cradle.

None of the wounds were treated with antiseptics or in a plaster cast.

possibility that the size of the lesion, and the type of dressing employed may be of importance in determining whether and to what extent the patient may pollute his surroundings. It should also be mentioned that some of the patients were not suffering from infected accidental wounds, only H.A.Y., E.L.L. and C.A.R. being in this category. The remainder had a purulent discharge due to an infected blister (H.U.N. and D.E.A.), ulcers (F.I.T., M.U.R. and H.A.M.) or following drainage of some deep infection.

an infected wound are confined to the wound itself and the inner layers of the dressing, and that if these be handled with respect, there is little or no danger of transporting infection to other patients by the dresser or other attendant who is ordinarily careful to attend to the sterilization of his hands and instruments. So far as we are aware, however, the possibility that the organisms may be on areas of the patient remote from the wound, in his nasopharynx, on the outer layers of the dressings, on the bed clothes,

all of which are usually handled by the bare hands without subsequent sterilization, has in general not been demonstrated or even considered. It is principally the purpose of this section to show that even in trivial wounds with little discharge, the organisms may be present in almost any area of the bed and its contents, remote from the wound itself.

Hæmolytic streptococci on the skin of patients with infected wounds.—The results are given in Table II. It is clear that even the skin of areas

may be contamination of wide areas of the skin of nasopharyngeal carriers who do not have the complicating presence of an infected wound. On the other hand, there was contamination of the skin of areas some distance from the wound in three patients who were not nasopharyngeal carriers.

On the whole, therefore, the skin of these patients was not extensively contaminated, but because it may be, and not necessarily in patients with extensive wounds or copious dis-

TABLE II.
PRESENCE OF HÆMOLYTIC STREPTOCOCCI ON THE SKIN AND IN THE NASOPHARYNX OF PATIENTS WITH INFECTED WOUNDS

Patient	Time discharge present before survey	Site of wound	Strain from wound	Nose	Throat	Saliva	Hair	Upper lip	Lower lip	Mouth corners	Chest	Back	Hands	Legs
H.A.Y.	48 hours	Forearm	Type 12	..	Type 12	..	..	..	..	..	..	..	..	..
E.L.L.	48 hours	Femur	Type 12	Type 12	Type 12	..	Type 12	Type 12	Type 12	Type 12	Type 12	Type 12	Type 12	Type 12
B.R.O.	Operation 48 hours previous.	Pelvis	Type 12	..	..	..	..	..	..	..	..	..	..	..
C.U.P.	24 hours	Knee	Not typed	..	Type 5	..	..	..	..	..	..	..	..	..
F.I.T.	3 months	Buttocks and foot	Type 12	..	..	..	..	..	..	..	..	..	..	..
C.A.R.	72 hours	Knee	Type 1	..	..	..	..	..	..	..	..	..	Type 1	..
C.V.H.	72 hours	Neck	Type 26	..	Type 26	..	..	..	..	Type 26	Type 26	Type 26	..	Type 26
M.U.R.	Several days	Leg	Type 5	Type 5	Type 5	Type 5	..	..	..	..	..	..	..	Type 5
W.O.L.	Several days	Otitis media	Type 17	..	Type 17	..	..	..	..	..	..	..	..	..
		Following mastoid-ectomy	Type 17	..	..	..	..	..	..	..	..	..	..	..
H.U.N.	72 hours	Hand	Type 1	..	..	..	..	..	..	..	..	..	..	..
P.O.W.	48 hours	Finger	Type 5	..	Type 5	..	..	..	..	..	..	..	..	..
McA.	48 hours	Knee	Type 1	..	..	..	..	..	..	Type 1	..	..	..	..
H.A.M.	48 hours	Leg	Type 12	..	..	..	..	..	..	..	Type 12	..	..	Type 12
D.E.A.	48 hours	Foot	Type 1	..	Type 1	..	Type 1	..	..	Type 1	Type 1	Type 1	Type 1	..

some distance from the wound itself may be contaminated by organisms of the same type as those present in the wound. In eight out of the fifteen patients, the organisms were also present in the nasopharynx and it is possible that some of the organisms on the skin may have been derived from this source rather than the wound. This is to some extent confirmed by the fact that the incidence of skin contamination would appear to be higher in those patients with organisms in the throat than in those without. It is also known from previous work⁸ that there

charges, there is obvious danger of unwitting transfer to other patients on the hands of the nurse or surgeon.

Hæmolytic streptococci in the nasopharynx.—As will be seen from Table II, no less than 8 of the 14 patients had hæmolytic streptococci in the nasopharynx. In 7 of them the organisms were the same type as those present in the wound. It would therefore appear that patients with a streptococcal infection of a wound are much more likely to have the same organisms in the nasopharynx than normal people whose

carrier rate for Group A has been shown to be about 7 per cent.¹

As already mentioned, however, only 3 of these patients had an infection of an accidental wound, the remainder having an otological infection, a discharging deep abscess or something of a similar nature. For this reason, the organisms in the patient's own nasopharynx may or may not be of importance in considering probable sources of a hæmolytic streptococci of accidental wounds. Indeed, there would appear to be no exact information as to the presence of hæmolytic streptococci in the throats of patients with infected accidental wounds. But in view of the results mentioned above and in a paper to be published by us in a forthcoming issue of this *Journal*, it would appear possible that a much higher proportion of them are throat carriers than is usually supposed.

Hæmolytic streptococci on the bedclothes.—A bacteriological examination was made of the bedclothes of all the patients. From Table III it will be seen that in a high proportion of the cases some part of the bedding was contaminated. The area in which the organisms were most frequently found was the lower sheet (10 out of 14). The bedspread was the next most frequently contaminated, the organisms being found in seven and the upper sheet and pillow in only five. The frequency with which the lower sheet was contaminated may have been

due to the fact that, following the practice of many hospitals, the lower sheet was discarded every day, but was replaced by that which had done duty as the upper for the preceding 24 hours. Thus the lower sheet had had longer contact with the patient. There is, however, evidence that the upper sheet may become contaminated very quickly, for in all the five instances in which the organisms were found on it, the sheet had never been on the bed longer than 7 hours at the time of test. As a rule the blankets were not examined but in three instances in which they were they were found to be free.

There is thus no doubt that the bedclothes may be contaminated by hæmolytic streptococci even when the wounds are small and with little or no discharge. This occurs as much in patients with the organisms in the nasopharynx as in those without.

Thus these investigations show that there may be very widespread contamination of the skin and the bedding, even when the wounds themselves are comparatively small and the amount of discharge trivial, and a high proportion of the patients have the organism in the nasopharynx with all that that implies. In addition to this, we have examined the outer layers of the dressings of two patients (B.R.O. and E.L.L.), and found them to be heavily contaminated. There was no apparent leakage of dis-

TABLE III.
PRESENCE OF HÆMOLYTIC STREPTOCOCCI ON THE BEDCLOTHES OF PATIENTS WITH INFECTED WOUNDS

Patient	Time discharge present before survey	Site of wound	Strain from wound	Nose	Throat	Pillow	*Upper sheet	*Lower sheet	Bedspread	Inner blanket	Outer blanket
H.A.Y.	48 hours	Forearm	Type 12	..	Type 12	..	..	..	..	..	..
E.L.L.	48 hours	Femur	Type 12	Type 12	Type 12	Type 12	Type 12	Type 12	Type 12	..	..
B.R.O.	Operation	Pelvic abscess	Type 12	..	..	..	..	Type 12	Type 12	..	..
C.U.P.	48 hours previously	Knee	Not typed	..	Type 5	..	..	..	..	..	..
F.I.T.	24 hours	Buttocks and foot	Type 12	..	..	..	..	Type 12	..	..	..
C.A.R.	3 months	Knee	Type 1	..	..	..	..	Type 1	Type 1	..	..
C.V.H.	72 hours	Neck	Type 26	..	Type 26	Type 26	Type 26	Type 26	Type 26	..	..
M.U.R.	72 hours	Leg	Type 5	Type 5	Type 5	..	Type 5	Type 5	..	..	..
W.O.L.	Several days	Otitis media	Type 17	..	Type 17	Type 17	..	..	Type 17	..	..
	Several days	Following mastoidectomy	..	..	..	Type 17	..	..	..	..	..
H.U.N.	72 hours	Hand	Type 1	..	..	..	..	Type 1	Type 1	..	..
P.O.W.	48 hours	Finger	Type 5	..	Type 5	..	Type 5	..	Types 11, 12	..	..
H.A.M.	48 hours	Leg	Type 12	..	..	..	..	Type 12	Type 12	..	..
McA.	48 hours	Knee	Type 1	..	..	..	..	Type 1	..	..	..
D.E.A.	48 hours	Foot	Type 1	..	Type 1	Type 1	Type 1	Type 1	Type 1	..	..

*Sheets changed in following manner:—

Top sheet used one day—then used to replace lower sheet and fresh top one put on. Therefore no sheet exposed more than 48 hours.

charge in these cases and the nurse was handling this part of the dressings with her bare hands.

Thus, the whole of the contents of the bed are to be looked upon as a potential source of organisms for the transfer of infection to other patients. Far from the organism being confined to the wound and its immediate vicinity, as is usually believed to be the case, they may be found in almost any part of the bed and its contents. In consequence, any one who handles any part of the patient or his bed may contaminate his hands or any instrument he uses for the purpose. If, as is quite often the case, he handles or attends an as yet uninfected wound without very careful attention to sterilization, he may transfer infection.

2. TRANSFER OF INFECTION BY AIR CURRENTS

As a preliminary, a study was made of the number of hæmolytic streptococci in the air of wards in which cases with hæmolytic streptococcal infection of wounds were being nursed. This was carried out in ten patients, the results being given in Table IV.

In every instance this was the first surgical infection to have made its appearance in the particular ward for many months. It may therefore be assumed that the great majority of the hæmolytic streptococci isolated in this way had been derived from the wound. This is confirmed by the fact that the serological type of every colony of hæmolytic streptococci isolated

on the plates was ascertained and, as will be seen from Table II, in the great majority of instances, they were members of the same type as that present in the wound.

It is thus clear that even comparatively trivial wounds such as that of F.I.T., may produce detectable pollution of the atmosphere of the ward in which they are being nursed. It must be admitted that the number of hæmolytic streptococci isolated was rather smaller than in comparable estimations carried out by White⁹ in puerperal cases, by Cruickshank¹⁰ in burns and by Miles *et al.*⁶ in wound infections. In the case of the puerperal infections, the patients were in small single-bedded wards, with no artificial ventilation; and the burns and wounds were in wards in which there was more than one infected case. In our series, there was only one infection in the ward and the wards were comparatively large, there being never less than four patients in any one ward and in some as many as fifteen. Dilution may therefore account for the disparity in the results. Moreover, our determinations were carried out during a very quiet period of the day and, as will be seen later, the numbers may increase considerably during times of activity.

It should also be pointed out that in a number of instances there was very little purulent discharge and the area of the wound was very small, so small that one would hardly suspect that it could cause air contamination at all. In

TABLE IV.
NUMBER OF COLONIES OF HÆMOLYTIC STREPTOCOCCI ON PLATES EXPOSED FOR 2 HOURS IN THE AFTERNOON

Patient	Time discharge present before survey	Wound	Strain from wound	Nose	Throat	2' Radius	2-4' Radius	4-8' Radius	Over 8'
H.A.Y.	48 hours	Forearm	Type 12	..	Type 12	..	..	..	..
E.L.L.	48 hours	Femur	Type 12	Type 12	Type 12	28	1	1	..
	96 hours			..	..	All Type 12	Type 12	Type 12	2
B.R.O.	Operation 48 hours previously.	Pelvis	Type 12	..	..	1	Type 12	..	Type 12
F.I.T.	3 months	Buttocks and foot	Type 12	..	..	Type 12	..	..	..
C.A.R.	72 hours	Knee	Type 1	..	..	2	..	..	..
C.V.H.	72 hours	Neck	Type 26	..	Type 26	Type 1	..	..	2
C.U.P.	24 hours	Knee	Not typed	..	Type 5	8	..	..	Type 26
M.U.R.	Several days	Varicose ulcer	Type 5	Type 5	Type 5	Type 26	Type not determined	..	..
						3	..	..	1
						2 Type 5	..	..	Type 17
						1 Type 17	..	..	..
H.U.N.	72 hours	Hand	Type 1	..	..	1	1	..	..
W.O.L.	Several days	Otitis media	Type 17	..	Type 17	Type 1	Type 5	2	..
						1	..	1 Type 17	..
						Type 17	..	..	..

Controls (3) done at same period of day in wards without infections. No hæmolytic streptococci found.

other cases, hæmolytic streptococci of the same type were also present in the nasopharynx of the patient. Expulsion of these would no doubt add their quota to those derived from the wound but on the whole there was little difference between the degree of air contamination surrounding those with the organisms in the nasopharynx and those without.

It cannot be said that this air pollution invariably occurs but there is no doubt that it occurs sufficiently often to render these patients a potential menace to their neighbours.

METHODS BY WHICH THE ORGANISMS REACH THE ATMOSPHERE

It would be legitimate to assume that the organisms in the air of the wards had reached it directly from the wound, its dressings or the

which a breeze of very low velocity (40 to 50 feet per minute) was passing. This velocity is only just perceptible and was purposely made very low in order to simulate the type of air movement which might be encountered in a ward. The tunnel itself was constructed of cardboard, being 1 foot square in section, and long enough to enable blood agar plates to be suspended across the tunnel in the centre of the section at 1, 2 and 3 metres from the dressing. Holes were provided at the sides of the tunnel to enable the gloved hand to be inserted for the manipulation of the dressing or for the insertion and removal of blood agar plates. The low wind velocity was obtained by using a low-powered fan and a screen perforated with holes whose number was determined by trial and error (see Figs. 1 and 2).

Because the number of infected particles present in the plates at 2 and 3 metres was usually very little less than those on the plate at 1 metre, the longer tunnel was abandoned because of its inconvenience and only one section, 1 metre long, used instead.

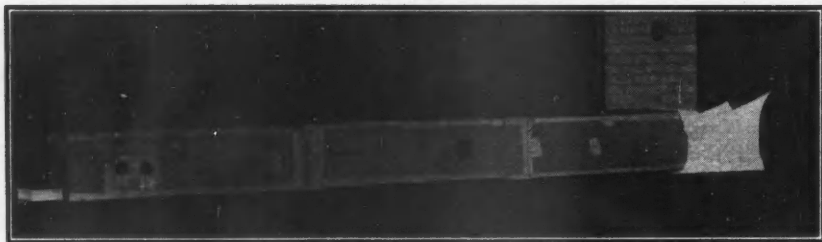


Fig. 1

nasopharynx. It is, however, possible that other contaminated areas such as the bedclothes may be more important in this regard. This question is studied in some detail in this section.

1. *Contamination of the air by the wound or its dressing.*—Release of infected particles from wounds themselves directly into the atmosphere must be very unusual because they are usually covered up and the moist or purulent condition of the infected area usually holds the organisms in check. In any event *ad hoc* investigation of this point is hardly possible. It would seem much more probable that the organisms in the air had come directly from the dressings, and for this reason we have studied this question in some detail. Infected dressings may cause contamination of the atmosphere in two ways; by direct release of the particles into the air stream or by infecting the bedclothes, which when disturbed may, in turn, cause infection of the atmosphere. In this section we shall only consider the former.

For this purpose, actual dressings were taken straight from the wound, cut into pieces about 10 cm. square and hung in a wind tunnel along

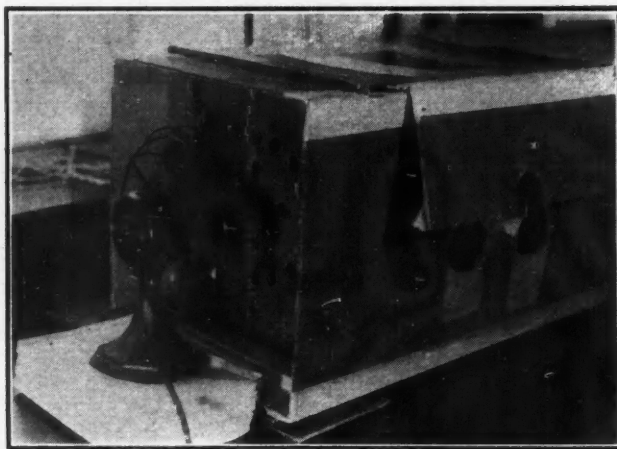


Fig. 2

It was very quickly found that even a heavily infected dressing which was merely allowed to hang in the air stream did not pollute it to any extent. This applies as much to dressings which have dried as to those which are still wet. In order to effect release of infected material a combination of drying and some form of movement was necessary. Mere folding of a piece of infected lint which has been allowed to dry may allow release of many infected particles.

The results obtained with the dressings from the patient E.L.L. are given in Table V. The breeze was blowing the whole of the time the dressing was in the tunnel and for most of the time it was left undisturbed. At intervals given in the table, new blood agar plates were put into position, the gloved hands were inserted, the dressing folded and pulled about for two minutes only, and the blood agar plates left

TABLE V.

RELEASE OF INFECTED PARTICLES FROM DRESSINGS AND TRANSPORT BY AIR CURRENTS

Time	Treatment	State	Number of colonies of hæmolytic streptococci on plates at 1 metre
0-30 M.	Still	....	0
30-35 M.	Agitation	Wet	2
60-65 M.	Agitation	Pasty	5
90-120 M.	Still	Pasty	0
120-125 M.	Agitation	Pasty	14
190-195 M.	Agitation	Dry paste	44
240-300 M.	Still	Dry	1
300-305 M.	Agitation	Dry	40

Air velocity 50 feet per minute. Temperature 75° F. Humidity 80 per cent.

in the stream for three more minutes and then removed. It will be noted that even towards the end of the experiments, when the dressing was almost dry and the infected material quite powdery, very little was released so long as the material was allowed to hang undisturbed. But as soon as the material was manipulated for even so short a period as two minutes many infected particles were released.

Thus there is every reason for believing that infected dressings covering wounds may themselves cause a considerable degree of air pollution. This for the most part will occur during the necessary manipulations attendant on dressing the wounds and will naturally be much less when the wound is left undisturbed and kept permanently covered as by plaster. It is probable that fidgetting or struggling on the part of the patient may contribute their quota of organisms.

These experiments also indicate the probable mechanism by which the bedclothes become contaminated. For if the dressings release infected particles into the air stream when they are disturbed, there is no reason why the bedclothes should not also become infected, whether by direct contact with infected parts of the dressings or by air currents in the bed itself. This

will be facilitated if there be some drying of the dressing at its edges and there is some movement of the infected area.

2. *The nasopharynx*.—In view of the fact that some of the patients had the organisms in the nasopharynx it is possible that the expulsion of these organisms by talking, etc., may be responsible. On the other hand, there is evidence that air contamination may occur around patients who do not have the organisms in the throat or nose. (See F.I.T., C.A.R. and H.U.N. in Table IV.) Moreover, Hare⁴ has pointed out the improbability of patients who are lying in bed causing much contamination of the air directly from the nasopharynx.

3. *The skin*.—It would seem highly improbable that the organisms on the skin can be a serious cause of air contamination. In several instances, the organisms were detected in the air but not on the skin.

4. *The bedclothes*.—Comparison of Table III with Table IV will show that of the 8 patients who were polluting the atmosphere, no less than 7 had organisms on the bedclothes. Of the two who failed to cause contamination of the air, one, H.A.Y., had no detectable contamination of the bedclothes while the other, B.R.O., did have some. It is, of course, possible that the organisms on the bedclothes had come from the air of the ward, infected directly from the wound, but it is much more probable that the converse took place and that the organisms in the air had been derived from the bedclothes, infected from the wound or its dressings, and that dissemination of the organisms into the air via the bedclothes rather than direct contamination of the air by the dressings would appear to have been the usual course of events.

In view of this it would seem highly probable that the contamination of the air would be higher while the bed is being made than during more quiet periods of the day. A series of estimations was therefore carried out in which the air contamination during the busy morning period when bedmaking, dusting and sweeping were in progress was compared with that during the quiet periods of the night. The results are given in Table VI. It will be seen that the air contamination during the early morning was very much greater than during the night.

It might, however, be argued that part of the air contamination had come from the dust of the ward rather than from the bedclothes. This

TABLE VI.
CONTAMINATION OF THE AIR DURING QUIET AND BUSY PERIODS OF THE DAY

Patient	Diagnosis	Naso-pharynx	Bedclothes	Skin	Night		Morning	
					Total colonies	Hæmolytic streptococci	Total colonies	Hæmolytic streptococci
H.A.M. Type 12	Cellulitis right leg	...	Lower sheet, bedspread Type 12	Chest leg (left) Type 12	779	1 Type 26	15,544	23 All Type 12
McA. Type 1	Infection right knee pre-patellar	...	Lower sheet Type 1	Corners of mouth, leg (left) Type 1	1444	2 1 Type 5 1 Type 28	17,167	40 9 Type 1 23 Type 12 6 Type 5 2 Not typed

Note.—Both the above patients were in the same ward. The estimations on H.A.M. were carried out before McA. was admitted and H.A.M. was still present at the time that those on McA. were carried out. Moreover, the ward was swept from H.A.M. toward McA. and this may account for the relatively large number of Type 12 hæmolytic streptococci isolated during this estimation.

is rendered improbable by reason of the two estimations on E.L.L. (Table IV). The first was carried out with the patient in bed in the usual way and the leg on a Thomas splint cocked up in the air. A high degree of air contamination was produced. This, having unfortunately come to the ear of the surgeon in charge, he ordered the patient and the limb covered with sheets. The second determination with these *in situ* showed much less air contamination. Other determinations were carried out in which the bedmaking process was divorced from the sweeping. The bed was specially made during the quiet of the afternoon when no sweeping or dusting were carried out. A series of plates was first exposed round the patient for 15 minutes. They were then replaced by fresh ones and the bed made in the ordinary way. A considerably greater number of organisms were isolated on the second set of plates.

It therefore appeared to be worth while to investigate whether the pollution of the atmosphere would be less if the bed were made very carefully with a minimum of shaking of the bedclothes. For this purpose, a series of plates was first exposed round the patient in the afternoon. The plates were then replaced by fresh ones and the bed made very carefully indeed, the sheets being folded and the blankets treated with every respect. Another set of plates was then set out and the bed made again in the usual violent manner. The results are given in Table VII. It will be noted that, contrary to what might have been expected, the quiet and careful bedmaking released almost as many organisms into the atmosphere as the usual violent methods. It would therefore seem that the organisms are probably present on the bedclothes in the form of very light particles which can be released into the atmosphere when the bedclothes are disturbed in any way at all.

TABLE VII.
AIR CONTAMINATION DURING DIFFERENT TYPES OF BEDMAKING

Type of bedmaking	W.O.L. Type not determined		H.A.M. Type 12		McA. Type 1		D.E.A. Type 1	
	Total colonies	Hæmolytic streptococci	Total colonies	Hæmolytic streptococci	Total colonies	Hæmolytic streptococci	Total colonies	Hæmolytic streptococci
Plates exposed for 15 minutes before	Not done	....	Not done	....	185	0	221	3 All Type 1
Quiet 15 minutes' exposure	79	*6 Type not determined	1379	2 Both Type 12	1980	13 11 Type 1 2 Type 12	2048	49 All Type 1
Brisk 15 minutes' exposure	244	*14 Type not determined	2160	9 All Type 12	3336	25 All Type 1	3968	41 All Type 1

**Note.*—Many attempts were made to type the strains isolated from W.O.L. with no success. There can be little doubt that they were all the same.

Thus a high proportion of patients with hæmolytic streptococcal infection of wounds or similar discharge cause air contamination around them. And it is probable that this air contamination is due to contamination of the bedclothes in the first place which when disturbed release infected particles into the atmosphere.

DISCUSSION

These experiments were designed to investigate the potential danger to other patients of nursing infected wounds in the general wards of hospitals. It is true that this was demonstrated long ago by Lister but of late years there has been a tendency to forget these teachings. It is too readily assumed that septic infection of accidental wounds is inevitable by reason of the organisms which enter them at the time of infliction, and that infection of clean operation wounds is invariably due to a breakdown in the technique of the theatre. We feel that these assumptions are only true in very small part and that many infections both of accidental and operation wounds are, in reality, ward infections due to transfer of infection from other already infected cases. Indeed, in view of our findings, it is surprising that such infection occurs so seldom. But that the margin of safety is very narrow indeed is adequately demonstrated by the inevitable increase in the amount of sepsis which occurs in war time when wards become crowded, ventilation is inadequate and the personnel few in numbers and overworked.

These experiments show clearly why the margin of safety is so narrow, for it is clear that the whole of the contents of the bed containing a patient suffering from an infected wound are suspect and may be potentially infective for other patients; the skin, the nasopharynx and the bedclothes all being found in a high proportion of the cases to harbour potentially pathogenic strains of these organisms. Nor does the infectivity cease at the periphery of the bed; it extends as a miasma in the air round about it, the air-borne organisms probably reaching the air from the bedclothes by being shaken off when the bed is made. This may occur as much with small trivial wounds as with large open wounds.

Hare⁸ has pointed out that this was probably the method by which nasopharyngeal carriers cause infection in others, a conclusion recently confirmed by the work of Thomas and Van den Ende.¹¹

Thus not only may infection be transmitted by air currents but also by the hands of the nurse or surgeon who may have touched the bedclothes, bathed the patient, etc., and without washing the hands, attended an uninfected wound. Even the outer layers of the dressings which we have observed to be handled without hesitation by nurses and surgeons may be contaminated and the organisms be detectable on the hands.

The inference seems to us to be obvious: that under no circumstances whatever should a patient with an infected wound be permitted to remain in the same ward as patients with clean uninfected wounds. It is true that transfer of infection from patient to patient during peace time occurs but seldom, but when it does it is invariably a tragedy, the victim usually having had some operation not necessary to save life. This relative immunity in peace time is probably due to the fact that there is usually adequate cubic air space per bed, ventilation is efficient and more than one infected wound is seldom present at a time in any ward. But with less skilled attendance, or when there is hurry and overcrowding as is almost inevitable in war time, the barriers break down. In a previous publication, we have formulated suggestions for the handling of infected wounds in civil and military hospitals. These include the provision of a wing to which all patients with any sign of infection should be transferred; the division of the nursing and surgical staff of the hospital into two similar wings so that no one in attendance on an infected case comes into contact with a clean case; and provision for the segregation and bacteriological control of all nasopharyngeal infections amongst the patients and the personnel. Here we would only add that all the results reported in this paper confirm the essential soundness of these suggestions.

Other alternatives such as treatment of the bedclothes by the method advocated by Van den Ende, Edward and Lush¹² and Van den Ende and Spooner,¹³ oiling of the floors,¹⁴ the use of

ultraviolet light in the wards themselves and similar measures seem to us to be too clumsy and elaborate for general adoption, particularly under conditions of modern warfare. The expense of some of these measures must also be considerable. There is, moreover, no guarantee that under stress they might not break down. For these reasons, segregation of all infected cases appears to us to be simpler and more likely to be of value. Its only drawback is that it appears administratively to be difficult, but this is not a valid objection.

We are deeply indebted to Dr. W. E. Gallie and the members of the Department of Surgery in the University of Toronto for allowing us access to their cases and also to the nursing staffs of the teaching hospitals of this city who willingly co-operated in this work, frequently at great personal inconvenience to themselves.

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JAUNDICE AS A PÆDIATRICIAN SEES IT*

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THERE is ample reason for inquiring into a symptom such as jaundice, even though the variety of conditions in which it may occur ranges widely in the clinical field. The closer we can approach to a clear understanding of its physiological and biochemical derivation, the greater becomes its value as a diagnostic and prognostic index. The pædiatrician finds a particular interest in weighing the changing significance of any symptom, jaundice included, at different age levels. Moreover, re-appraisal is called for from time to time by reason of the fact that from decade to decade there is apt to be a shift in the incidence of many of the diseases with which jaundice is associated.

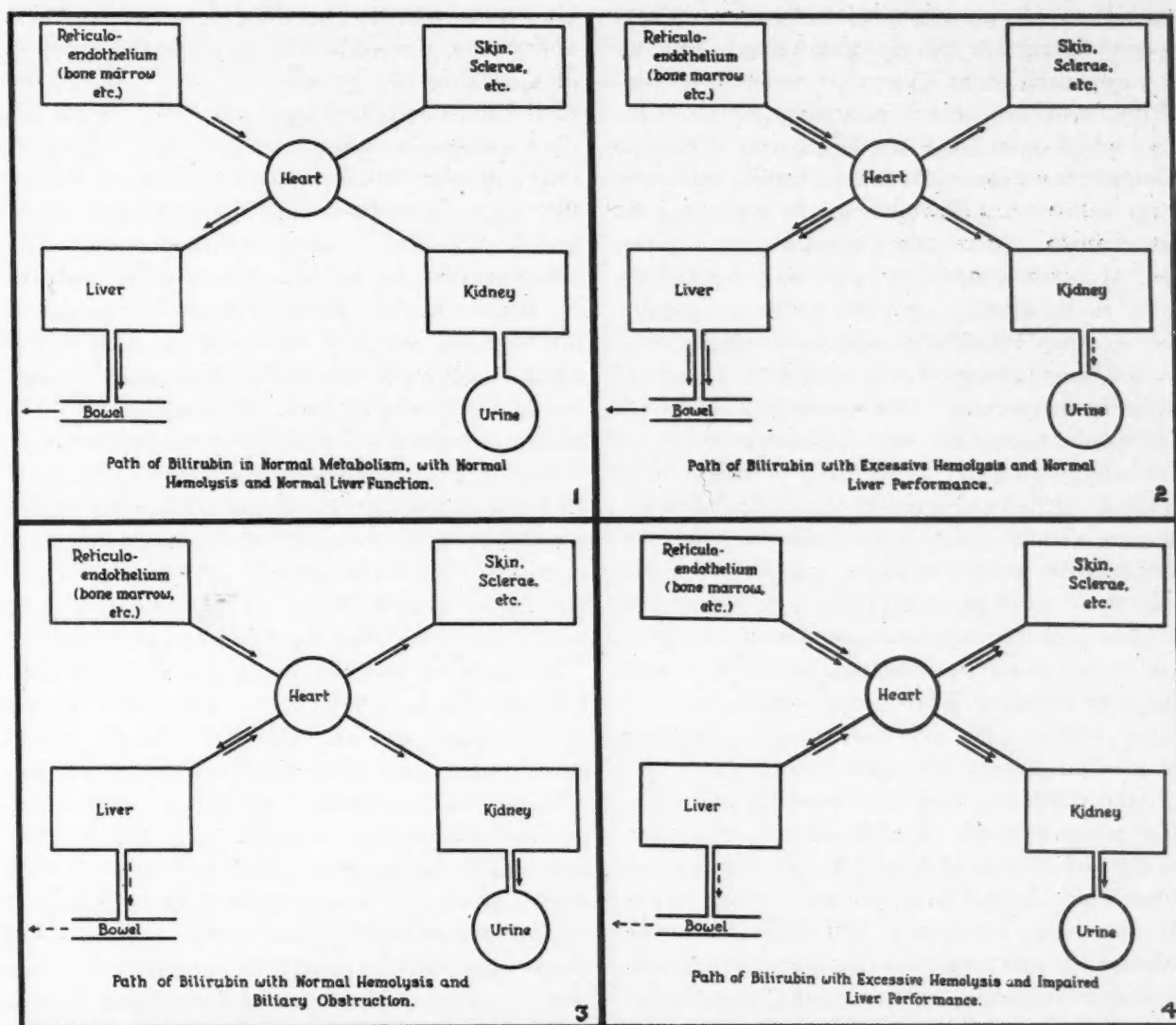
The colouring of the skin and other tissues in icterus reflects their staining with bilirubin which has spilled over, so to speak, from abnormally high levels in the blood. Presumably there is an element of selective adsorption involved here, for jaundice may be clearly present when plasma filtrates like cerebrospinal fluid and tears remain colourless. It is stated that in adults jaundice becomes clinically apparent

when the serum bilirubin level exceeds a value of about 2 mg. per 100 c.c., some variation in the threshold level being an individual characteristic. In children, however, the threshold level is appreciably higher, and in the neonatal period jaundice may not be detectable until the serum-bilirubin concentration has passed the 5 mg. mark, or in some infants even 12 mg.¹ Physicochemical reasons for this age-factor in tissue adsorption of bilirubin are not apparent. Indeed, the phenomenon seems paradoxical, in that one might have expected that the thinness and relative transparency of an infant's tissues would allow one to detect icterus with relatively small increments in the blood bilirubin level.

Jaundice, in any event, depends on an abnormally high level of bilirubinemia, and before going on to consider its clinical significance we ought to look back for a moment at the factors which allow bile pigment to accumulate in the blood. Hemolysis of red cells is constantly going on as a physiological process, the liberated hemoglobin being converted into bilirubin by the reticulo-endothelial cells, especially by those of the bone marrow. Bilirubin is also being constantly excreted, and is passed from the blood in liver sinusoids through their endothelial

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lining into the polygonal hepatic cells and on out into the bile capillaries which form the tributaries of the bile-duct system. Elevation of the blood bilirubin concentration can result from excessive hæmolysis, from interference with the process of excretion in the liver, or from combinations of these two. We must look, therefore, for causes of jaundice in processes which lead to an abnormally rapid rate of erythrocyte destruction and in disturbances of that special function of the liver which has to do with clearing the blood of this particular breakdown product of hæmoglobin. The bilirubin excreting power of normal liver tissue is considerable. It does not seem to be greatly impaired by physical pressure, for the extent to which metastatic neoplasms may invade the liver without causing icterus is well known. There are certain diseases which seriously compromise some of the other functions of the liver without appreciably affecting bilirubin excretion; an example is glycogen storage disease, which selectively interferes

with normal hepatic glycogenolysis. On the other hand, anoxæmia, circulatory failure, or almost any infection may compromise the liver's capacity to excrete bilirubin, and certain conditions such as infectious hepatitis seem to produce a selective disturbance of bilirubin clearance and are commonly accompanied by jaundice.

Not all of the bilirubin encountered in the blood in different clinical states behaves alike with respect to its ability to escape from the blood stream by penetration of the limiting endothelial membrane. When jaundice depends on biliary obstruction or on injury to hepatic cells bile pigment is promptly and readily detectable in the urine. On the other hand, in jaundice dependent chiefly on excessive hæmolysis, as in familial hæmolytic icterus (often called acholuric jaundice), the urine may fail to give a positive test for bile pigment. In both of these types of jaundice the pigment is identical and its concentrations in the blood may be at equal levels. The differences in its behaviour

depend on physico-chemical influences. These factors again are poorly understood, but we may approach them with some measure of confidence because certain relatively simple tests exist which enable us to distinguish diffusible bilirubin from non-diffusible bilirubin, and help in the differential diagnosis of the physiological disturbances underlying jaundice in a given case. I refer first to the van den Bergh test, which in its simplest qualitative or semi-quantitative form consists of the mere addition of Ehrlich's diazo reagent to a sample of the serum under investigation. If the mixture takes on a purplish colour at once, the presence of an appreciable quantity of diffusible bilirubin is revealed. This is also referred to as a "direct" reaction. If the purple colour develops only on standing for some minutes, non-diffusible or "indirect" reacting bile pigment is present in amounts greater than normal, for the reagent is of such limited sensitivity that little if any change in colour is developed by mixing it with normal serum. The addition of alcohol brings out all the colour that can be developed by both the diffusible and the non-diffusible fractions present in the sample, and serves as a measure of the total level of bile pigment, a device which is especially useful in cases where both excessive hæmolysis and impaired liver performance are present. Another very simple test is carried out by precipitating the serum or plasma proteins by the addition of acetone in excess and filtering or centrifuging the precipitate. A yellow colour visible in the precipitate indicates diffusible or direct bilirubin.

These simple tests are of great value in differential diagnosis of the underlying causes of jaundice in any given case, by reason of the well established fact that the presence in the blood serum of appreciable quantities of direct or diffusible bilirubin carries with it an immediate indictment of the liver, or at least of the mechanism involved in the delivery of bile into the intestinal lumen. The block may be at any level from the papilla of Vater on up through the biliary duct system to the hepatic cells themselves; but at least this degree of organ localization is possible. Although inspection of the stools and chemical testing for bile pigment when the stools are pale or chalky should not be neglected, a positive direct van den Bergh test in a sample of blood serum is of greater value in that it is less likely to give false or equivocal information. Stools may be

clay-coloured after the feeding of protein milk and yet may contain bilirubin; or they may be of normal or nearly normal colour when injury to the liver cells is incomplete or when the bile duct system is only partially blocked, or even with complete biliary obstruction when enough bile pigment diffuses into the intestinal lumen at other levels of the alimentary tract. This last phenomenon has often been observed even in anatomically proved cases of complete obliteration of the bile-duct system. And again, though the urine should always be tested for bile pigment in cases of jaundice, it is not always accurate to infer that the presence of bilirubinuria indicates major liver dysfunction. For the active intravascular hæmolysis which results from a mismatched transfusion is accompanied by an abundance of bile pigment in the urine so soon after the catastrophe as to make it unlikely that liver damage plays a part.

In cases of obvious jaundice, then, in addition to the usual clinical observations which in the course of time afford a measure of the severity and course of jaundice as a symptom, it is pertinent to follow the red cell count and hæmoglobin level as indexes of significant blood destruction, to note the colour of the stools and, where necessary, to test them for bile pigment, to look for bilirubin in the urine by any one of the simple chemical tests or even by the foam test, to perform the van den Bergh test or the acetone precipitation test on a sample of serum, and, if adequate technical facilities are at hand, to measure from time to time the total bilirubin concentration in the serum or plasma. In pædiatric work these rather simple manœuvres can be counted on with confidence to furnish all the data one will need for evaluating the factors involved in pathogenesis, and thus for arriving at a reasonably accurate diagnosis of the underlying disease process. Moreover, the results of such tests furnish us the most useful of all bases of classification of clinical causes of jaundice, a classification, moreover, which is founded on objective information and which does not lose its bearings in a fog of assumptions. The evaluation of the cause of jaundice in adults may require the application of a wider variety of diagnostic tests, such as the determination of serum phosphatase concentration² and Hanger's cephalin flocculation test;³ but I shall not attempt to discuss these, inasmuch as they have not been found essential in working with infants and children.

In the past few years my associates at the Babies' Hospital and the Sloane Hospital for Women in New York have been paying particular attention to jaundice occurring in the neonatal period. The contributions of Canadian investigators in this field have been monumental, and a large fraction of our own work has served merely to corroborate the data already obtained and the interpretations already applied, notably by the Montreal group.⁴ Students of the problem now generally concede that in any large group of newborn infants about one-third to one-half will show clinically manifest jaundice; that this jaundice appears oftenest on the second or third day, increases in intensity for a few days (usually only one or two) and then fades out more slowly; that in general its severity matches closely the elevation of the bilirubin concentration in the infant's blood serum; and that, as a rule, the earlier jaundice appears, the more intense is it apt to become and the longer may it be expected to endure.

It is agreed that virtually all newborn infants show a hyperbilirubinemia during the first week of life, whether they develop clinical jaundice or not; that the source of this extra bilirubin in the average case is the superabundance of erythrocytes which, though they were necessary for tissue oxidation at the relatively low oxygen pressures of the intra-uterine fetal circulation, are no longer essential to the infant who depends on his lungs rather than on his umbilical cord for his oxygen supply; an explanation long ago made clear by Goldbloom and his collaborators.⁵ It is becoming increasingly evident, however, that the piling up of large amounts of bilirubin in the blood of these infants and their tendency to exhibit jaundice is not exclusively dependent on the amount of blood which they get rid of in this adjustment, for other factors come into play. The one about which controversy has been longest indeterminate pertains to the adequacy of liver function at this age. Evidence arrived at in various ways now seems to bring a clear indictment against the liver. This organ may at such times be only immature; it is certainly not permanently disabled; but in even the mildest of these cases of neonatal jaundice the levels of bilirubinemia attained seem to depend in part on some factor other than hæmolysis and new formation of bilirubin, and that factor is inferred to be liver insuff-

iciency. In the moderately severe and in the severe cases the argument for liver damage is incontrovertible.

Another significant feature on which attention has recently been focused anew is the demonstration that the hæmolytic process and the piling up of bile pigment in the blood commences before birth and therefore cannot depend exclusively on the adjustment to the oxygen pressure of respired air. Although practically all infants are born with a higher level of bilirubin in their umbilical cord blood than could be considered normal for an adult, the infants with the highest levels are precisely the ones who later go on to develop neonatal jaundice. Nearly twenty years ago Williamson⁶ had demonstrated the occurrence and suggested the importance of this intra-uterine hæmolytic process by showing that the infants who developed neonatal jaundice were the ones in whose placentas the largest deposits of iron had accumulated, and this iron was rightly presumed to represent the residuum of hæmoglobin breakdown. Recent studies carried out by immunologists⁷ indicate that under certain conditions the mother may develop agglutinins and hæmolysins to the blood of her offspring while it is still unborn, and that even before birth some of these antibodies may pass the placental barrier, enter the fetal circulation, and there initiate intravascular hæmolysis. These observations, while still incomplete and of preliminary scope, provide a working hypothesis to explain the familial occurrence of icterus gravis and erythroblastosis foetalis in a more satisfactory manner than any other theory of pathogenesis that has thus far been brought forward. Whether this theory of sensitization, so to speak, of the mother to the erythrocytes of her child *in utero* may be extended to account for milder instances of neonatal jaundice, for the frequency with which jaundice is encountered among premature infants, and for other related peculiarities of neonatal behaviour in regard to bilirubin metabolism, remains to be worked out.

In differential diagnosis of causes of jaundice during the first week after birth the rule, obviously, is to regard all cases as examples of physiological neonatal jaundice until proved otherwise. We now recognize a smooth, progressive gradation of cases of jaundice caused by this mechanism from the simplest, most transitory, example through all degrees of

severity up to the rapidly fatal cases with intense jaundice, known in the older terminology as *icterus gravis*. But sometimes the cases of only slightly less severity survive; indeed, they may develop an even more intense jaundice than some of the fatal cases which end in death before there has been time to pile up the greatest possible store of bilirubin in the tissues. It is becoming customary in some centres of study to call these survivors examples of *erythroblastosis foetalis*, or *erythroblastosis neonatorum*, even when their blood stream fails to contain an excess of erythroblasts. A better device possibly would be to refer to them all as examples of *haemolytic dyscrasia* of the newborn, putting the emphasis on the underlying pathogenesis of the symptom rather than on an accidental morphological accompaniment of only a fraction of the total number of cases, and admitting from the start that all grades of severity may be encountered.

The important diagnostic and prognostic features which have emerged from recent studies are that the severe cases can often be recognized because of the early development of jaundice, discoloration of the amniotic fluid and of the vernix caseosa bearing witness to the onset of active *haemolysis* even before birth; that in the severe and serious cases there is a rapid intensification of jaundice for as many as five and even six days after birth; that for a time increasing amounts of bile will be detectable in the patient's urine, while at the same time the van den Bergh reaction in the blood serum, originally mainly "indirect", soon comes to show a strong direct reaction, indicating that the excretory function of the liver has been overwhelmed and that intrahepatic bilirubin has piled up in amounts large enough to cause actual obstruction and rupture of bile canaliculi; and that the infants who survive are prone to have a large, hard liver for several weeks. A certain proportion of them, fortunately not over 10 per cent, will eventually show serious retardation of mental and behaviour development, although these last most ominous manifestations may not be apparent until many months after the jaundice has entirely disappeared.

During the stage of rapid *haemolysis* which accompanies the active phase of the disease process these patients may quickly become desperately anæmic. Since anoxia of liver cells is one of the factors which is known to add to the liver's inability to excrete bilirubin through the

normal channels one might hope to retard this process by early resort to transfusion, but we have time and again seen transfusion serve only to feed fuel to the flames, permitting further *haemolysis* to take place and adding to the burden of bilirubin thrown against the already overtaxed liver. The work of Levine and his collaborators⁷ on blood agglutinins has furnished at least a partial explanation of this phenomenon, and has led to the general warning that neither parent should be used as a donor under these circumstances. Selection of a blood relative of the mother as a donor offers a favourable probability of avoiding further *haemolysis* of the transfused cells by the infant's plasma.

After the first week or ten days of post-natal life a continuing increase in the severity of jaundice usually points in another direction, and tends to incriminate the excretion process in the liver or to arouse suspicion of obstruction of the bile ducts themselves. This is particularly true of cases which have begun in a mild way, in contrast to those just described in which jaundice was apparent at birth or on the first day of life. In all infants at this age (that is, during the second and third weeks of life) active *haemolysis* is still going on, for the process of adjustment to the arterial oxygen saturation of pulmonary respiration has not yet been completed, and it is the rule for the *haemoglobin* curve to be still falling; but, even so, even with this extra burden of bilirubin to deal with the infant's liver should by this time have adapted itself to its task. With increasing jaundice at this age one will almost always find that the serum gives a strong direct van den Bergh reaction, and not infrequently the liver can be observed to be enlarging progressively.

Jaundice developing or increasing perceptibly during the second week of life used to focus attention on three principal diagnostic possibilities, neonatal sepsis, syphilis, and congenital malformation of the bile passages, with the last of the three being regarded as the least likely on the basis of pure probability. However, times seem to have changed—at least, in New York. Neonatal sepsis is, for one thing, definitely more rare than was formerly the case, and when we do encounter it, jaundice does not appear to play as large a part in its symptomatology as was once taught. Can it be that the syndrome which in another day was called "birth sepsis with jaundice" may have had a different pathogenesis? *Icterus gravis* had been

known to obstetricians for more than fifty years, but, traditionally, it was uniformly fatal; recovery wasn't "cricket".

Erythroblastosis *fœtalis* and the non-fatal cases of icterus gravis or of the hæmolytic dyscrasia of the newborn have been under active discussion for little more than a decade. It seems quite possible, on reflection, that cases of jaundice which nowadays would be put in one of these latter categories might, fifteen, twenty, or twenty-five years ago, have been blamed (as was so much else, to be sure) on birth sepsis. Times have changed too with regard to congenital syphilis, so that teaching hospitals experience more and more difficulty in finding enough clinical material for educational purposes, and we have to go far back in our records for a case of syphilitic jaundice in an infant.

And so the tortoise has caught up with both of these hares, and congenital malformation of the bile ducts with obstruction has now come to be in our experience the commonest cause of progressively increasing jaundice of early infancy. It is important to emphasize the characterization, "progressively increasing". We do not expect that these patients will give a history of having been jaundiced at birth.⁸ In fact, many times nothing unusual is noticed until the patient is a week or ten days old, and even at that time the degree of jaundice may not be intense. We do not even expect the parents to notice anything wrong with the child's stools or urine, and in the majority of instances their inquiry as to the cause of the jaundice bespeaks curiosity rather than alarm. By the time the patient is brought for study he may have failed to gain in weight and vigour at the average rate and may show minor digestive symptoms such as anorexia and regurgitation, or even occasional vomiting, but these are signs devoid of specific significance. We do expect to find that in addition to readily visible jaundice he has enlargement and increased firmness of the liver, and his spleen is apt to be easily palpable. Unlike the patients with severe degrees of neonatal jaundice of hæmolytic origin, who seldom if ever exhibit either itching of the skin or a tendency to hæmorrhage, the infants with jaundice due to congenital malformation of the bile ducts are prone to show one or both of these signs. Some of them are constantly restless and uncomfortable and keep pawing at their trunks and buttocks, which may be covered with scratch marks.

About one-third or more of them bleed with unusual ease, sometimes from known trauma, sometimes apparently spontaneously. Their blood-clotting time is often prolonged, and a deficiency of prothrombin can be demonstrated by appropriate analysis. A diagnosis of congenital malformation of the bile passages, suspected on clinical evidence alone, can usually be confirmed by additional laboratory tests, such as have already been described.

Every effort should be made to identify these cases early and to explore them surgically in the hope that some procedure for establishing an effective channel between liver and gut will be applicable. Only by such means can one expect to arrest the course of a relentlessly progressive and eventually fatal biliary cirrhosis. In this respect our experience at the Babies' Hospital has been less fortunate than that reported by some others; too often the anomaly found at exploratory operation is such that no remedial procedure is feasible. It is a matter of luck, and of luck alone, whether the point of obstruction lies above or below the junction of the cystic duct with the common bile duct. In the former case no anastomotic operation is feasible; in the latter, cholecystoduodenostomy or cholecystgastrostomy can at least be attempted. Probably the largest series of successful operations in congenital obstruction of the bile ducts reported in the literature is that described by Ladd, of Boston.⁹ In 1935 he was able to cite 9 effective operations out of a total of 15 attempted.

While congenital malformation of the bile passages now accounts for the majority of cases of jaundice in which this sign commences around the second week of life, or is seen to increase in severity at that age, it does not monopolize the field. However, it is difficult to generalize about other types because of the fact that they are prone to differ widely and to represent a great variety of causal elements. We have seen obstructive jaundice caused by compression of the common bile duct by a hæmatoma in the wall of the duodenum, by dilatation of the gut above a congenital duodenal membrane, by tuberculous lymph nodes, and by swollen leukæmic nodes. Still another patient with obstructive jaundice was found to be suffering from a rare protozoan disease, toxoplasmosis, which in other cases has affected the brain and meninges and the retina, but which in this case apparently

involved the liver as well. There have been still other cases which not only fulfilled the usual criteria for the diagnosis of congenital biliary atresia but which at operation were found to have a collapsed gall bladder containing only colourless mucoid material and thin, cord-like and apparently completely atretic bile ducts; yet, after a hopeless prognosis had been given, some of these patients (we have seen two, and other clinics have had comparable experiences) have gone on to complete recovery with disappearance of jaundice, recession of the swollen liver, and reappearance of bile in the stools in normal amounts. Adequate explanation of such fortunate reversals of expectation is impossible, but it is clear that in dealing with cases of jaundice developing in early infancy but after the age at which physiological icterus is to be expected one must be prepared for surprises.

From the age of a few months to about six years there comes a lull during which jaundice as a symptom is relatively rare. When present it is more apt to depend on excessive hæmolytic as the predominating factor, and the resulting anæmia, whether it be of acute or of chronic type, is likely to dominate the symptomatology. Without entering at length into a listing or discussion of the various types of anæmia which may be involved in this respect, it may be pointed out that, taken by and large, an increasing proportion of the cases encountered have their origin in an unfavourable response to sulfanilamide or to one of the related drugs. Although hæmolytic crises of this sort may be dramatic, attended with fever, hæmoglobinuria, some degree of vasomotor collapse, and with all of the manifestations of a rapidly progressing anæmia, including even air-hunger, they are usually survived if the cause is promptly recognized and further administration of the drug stopped. Jaundice may appear within the first few hours of the attack, or not until the following day. The van den Bergh reaction of the serum, at first indirect only, later usually changes in part at least to direct. There is reason to believe that these acute hæmolytic reactions to sulfanilamide are more commonly encountered in children than in adults.¹⁰

From the age of about six years on up to puberty jaundice increases again in frequency, and the variety of its clinical causes broadens out. At this age level children begin to be

more susceptible to the mildly communicable disease, infectious hepatitis or acute catarrhal jaundice; the number of cases of rheumatic carditis increases, and there is greater likelihood of jaundice related to cardiac failure; furthermore, examples of jaundice accompanying pneumonia or appendicitis become more numerous. In cases in which the symptom icterus dominates the total clinical picture, infectious hepatitis will rightly be the first possibility to be considered. This is one of the outstanding examples of obstructive jaundice. Of the etiology of this disease little is yet known; persistent failure to demonstrate a specific bacterial etiology perhaps justifies the inference that a filterable virus is concerned. While it tends to be a troublesome rather than a serious disease, one occasionally encounters cases in which the course is both severe and prolonged and in which permanent damage to the liver leads to cirrhosis. The true etiology in such instances is not open to objective proof, in the absence both of specific cultural or immunological procedures and of pathognomonic morphological changes verifiable by biopsy; yet the association of these cases with epidemics lends strong probability to this interpretation. It is to be hoped that progress will be made in this field so that the accuracy of diagnosis may become comparable to that which characterizes the identification of another and rarer form of infectious jaundice, Weil's disease, or leptospirosis icterohæmorrhagica.

In this cursory survey of some of the conditions which produce the clinical symptom jaundice, much has necessarily been omitted and much has been touched on so briefly as possibly to obscure, rather than clarify, the underlying considerations of etiology and pathogenesis. I have tried to hold to the goal of viewing clinical syndromes from the standpoint of their physiological substrate and to keep in mind, as the pædiatrician must always do, the changing incidence of disease with changing age; and speaking only as a pædiatrician, but recognizing at the same time that a few stray shots may have ricocheted off into the adjacent domain of the internist, I have endeavoured to outline in a general way the program of further inquiry which should come to mind when one is confronted with a patient who is jaundiced.

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THE TREATMENT OF HYDRONEPHROSIS SECONDARY TO ABERRANT RENAL VESSELS*

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VASCULAR anomalies of the kidney and the harmful effects which they produce at times, present important problems in diagnosis and treatment. While modern methods of urological investigation have solved many of the diagnostic difficulties, in the field of treatment there is still a lack of unanimity in urological methods dealing with the hydronephrosis, which results from the obstructive action of renal aberrant vessels.

Accessory renal vessels were found in 21 per cent of 1,237 kidneys examined post mortem. Because of the intimate relation between lower polar aberrant vessels and the ureter, it is fortunate that only 6 per cent are of this variety. Except for occasional difficulties experienced at operation, if they are not recognized, upper polar vessels are relatively unimportant. It is also fortunate that lower polar vessels do not always obstruct the ureter, and produce hydronephrosis and its concomitant complications.

The rôle played by the aberrant vessel crossing in front of the ureter or behind it, has occasioned much argument among urologists. Some believe the vessel to be the primary factor in the production of hydronephrosis, while others are as firmly convinced that the hydronephrosis results from a renal ptosis, which causes the ureter to

sag across the vessels. A variant of this view was advanced by Winsbury-White, that "the compression of the ureter by the blood vessel is but a complication of a pre-existing hydronephrosis".

Quinby has suggested that in its earlier stages, the hydronephrosis is produced from the irritation of the pulsation of the aberrant artery, which disrupts or inhibits peristalsis, thereby inducing urinary stasis. Geraghty and Frontz, for reasons which do not seem very convincing, concluded that the hydronephrosis in this, as in several other conditions, is due to an inflammatory contraction of the uretero-pelvic junction.

That a vessel without the intervention of any other factor may produce serious obstruction is shown by an autopsy finding, which I am enabled to report, through the kindness of Dr. R. R. Struthers, at that time head of the Department of Pædiatrics of the hospital.

A small infant, 1 month old, was admitted to the Pædiatric Service, with a history of pyuria from its birth. The infant died soon after admission from what was considered a bilateral obstructive uropathy. Autopsy revealed a bilateral hydronephrosis, and hydroureter, beginning immediately above vascular obstructions caused by the passage of both ureters under the external iliac arteries. The obvious character of the obstructive process resulting from this intimate contact of vessel and ureter seemed to offer an unanswerable argument on behalf of those who claim that the aberrant

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vessel plays the dominant rôle in ureteral obstruction and the production of hydronephrosis.

The discussion as to the etiology of the hydronephrosis would be quite futile did the question not have such an important bearing upon the method of treatment. Treatment will be palliative, if early diagnosis be made, or radical, if applied too late. The most perfect therapy aims to conserve the kidney, and at the same time, to prevent further progress of the hydronephrotic atrophy, or of the infective process induced by it. To do this, a really effective attack must be aimed directly at the causal factor, if the further progression of the obstructive uropathy is to be retarded. It is imperative therefore that the surgeon have a clear conception of the etiology of the condition, otherwise, his intervention is misdirected, and failure or merely partial success will follow it.

If no ill-effects followed the ligation and section of the vessel, this would be the simplest and ideal procedure. Many older surgeons, including many continental operators, have no compunction in ligating renal aberrant vessels. There appears, however, to be a consensus among urologists that ligation of a renal artery will be followed by infarction of the area of the kidney supplied by the ligated vessel. While a relatively harmless fibrosis may be the ultimate result, in not a few reported instances, necrosis and suppuration have developed, necessitating a secondary nephrectomy. In one of our patients, in whom a vessel was ligated, death from an intercurrent disease occurred within a year. This gave us the opportunity to have a post mortem examination of the kidney. The segment of kidney supplied by the ligated vessel was transformed into a depressed and shrunken fibrotic area. We have also treated a case in which, in another hospital, a vessel had been ligated. Following the operation, suppuration of the kidney developed and the kidney had to be removed. It is generally maintained that only a small vessel should be ligated. The risk of ligating a large vessel is admitted by most, and some other procedure should be used. Ligation and section of a vessel is justified only when the vessel involved is insignificant.

Fixation of a ptosed kidney should be a panacea, if ptosis and not the vessel is the primary factor in producing the hydronephrosis. A recent clinical experience has intensified

our own disbelief in this hypothesis. A young soldier was found at operation to have an aberrant lower polar vessel too large to ligate with safety. A plastic operation seemed impracticable to the operator, consequently, nephropexy was tried. The result was unsatisfactory, and the hydronephrotic pains, which had been the reason for operation, were not relieved.

Various types of plastic operations have been devised and performed. Some of them are merely palliative and do not deal with the essential and primary condition, while others, in our opinion, are based upon a faulty conception of the etiological factor inherent in the condition. Among the operations are those designed to reduce the size of the bulging pelvis, by excision, dilatation, etc. Young has recently recommended and performed an operation which does not sacrifice the vessel, by resecting and resuturing the redundant pelvis in such a manner that the pelvis and ureter are drawn away from the vessel, thereby "permanently eliminating all possibility of ureteral obstruction".

The plastic operation illustrated in Kelly and Burnam, has applied the principle of the Heineke-Mikulicz operation for pyloric stenosis to conditions at the uretero-pelvic junction. This, in our opinion, is based upon a lack of appreciation of the factors involved in the condition of which we are speaking. Such a procedure can be of value only if a stricture or valve formation is present. In our experience, such a finding has not been encountered. If it does not occur, it is in all likelihood not the primary condition.

Winsbury-White, who believes that the hydronephrosis precedes the vascular obstruction, particularly when the obstruction is by the inferior branch of the renal artery, has described how a hydronephrotic kidney pelvis could be disengaged from an aberrant vessel. In discussing this experience, Keyes related a similar experience and suggested an improvement on the procedure of Winsbury-White, in that he plugged the pocket from which the bulging pelvis had been removed with a wad of fat, and sutured it there.

Nephrectomy has a definite place in the treatment of the hydronephrosis with which we are dealing. It should be reserved for those cases in which functional studies have shown the kidney to be valueless as a secreting organ. In our

opinion many situations arise in which a nephrectomy is performed although the kidney still possesses a substantial amount of function. These are cases where the operator believes a ligation and section is not justifiable, or does not fully appreciate the advantages of an appropriate plastic operation.

The objective of the surgeon should be the relief of the obstruction, and the conservation

No better appreciation of the situation has been given than that which Quinby presented in 1922. He argued that the operator has a choice of three procedures: nephrectomy, ligation and section of the aberrant vessel, and plastic operations on the dilated pelvis at or near its junction with the ureter. The rôles of the first two have been discussed and their place in treatment indicated. It remains for us

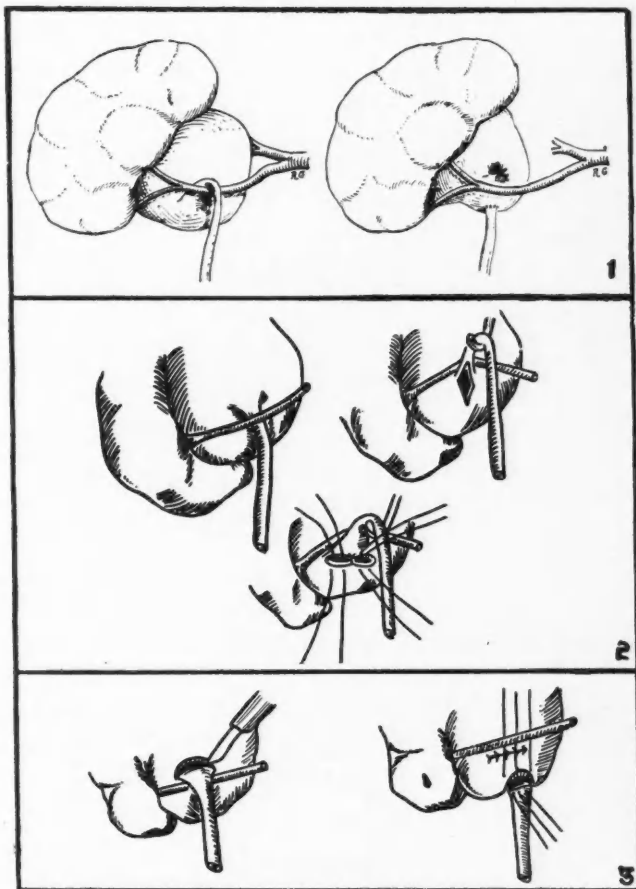


Fig. 1.—Operative procedure of Gregoire.
Fig. 2.—Kelly and Burman's operation.
Fig. 3.—Operative procedure of Quinby.

of the kidney if sufficient renal tissues remain to justify its preservation. This has been stressed by Henline and Walters. The latter wrote that "the safest and best procedure is the one which produces adequate and complete relief of the obstruction with minimal disturbance of the renal pelvis or ureteral tissues". He believes that the pelvis tends to resume its normal size after removal of the obstruction. Quinby believes that while the pelvis does not regain its normal size, it will regain or retain a considerable degree of function. The most important requirement is that the kidney pelvis shall have an unobstructed outlet, with perfectly free drainage of the urine.

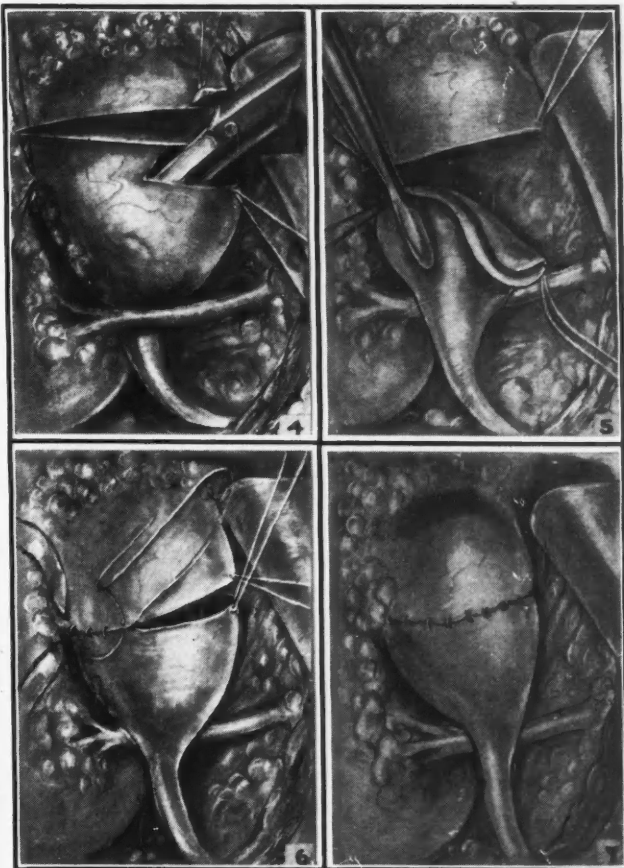


Fig. 4.—Author's procedure, first step.
Fig. 5.—Author's procedure, second step.
Fig. 6.—Author's procedure, third step.
Fig. 7.—Author's procedure, fourth step.

to deal with the type of plastic operation which combines most successfully the two features, *viz.*, the relief of the obstruction and the conservation of the kidney.

The earliest operations for hydronephrosis were done in the last decade of the last century. The term, ureteropyeloneostomy, was coined by Bazy in 1900. In a casual search, we have been unable to determine who did the first plastic operation for hydronephrosis caused by aberrant vessel. Apparently W. J. Mayo had used the procedure of reimplantation prior to 1909. Gregoire in 1912, made a definite plea for the use of such an operation. The ureter which entered the pelvis above the aberrant vessel was

sectioned away from the pelvis, and rejoined to the pelvis well below the vessel. In 1922, Quinby reported having performed this operation with brilliant success in three cases. He is responsible for popularizing the method in this country, and his earliest and subsequent publications have done much to clarify the whole subject.

In the last 13 years, we have utilized the same procedure with a material modification, which seemed to us to offer a greater chance of safety and success, in that the ostium is large enough so as to lessen the chance of any subsequent obstruction from narrowing by œdema or stricture, or valve formation. Three cases were reported in 1929. Since that time, the procedure has been used in an additional eight patients, with perfectly satisfactory results.

The operative procedure is as follows: when it has been decided to do a plastic operation, the pelvis and ureter are freed of all attachments, and mobilized as fully as possible, so as to allow them to be moved freely up and down. The important modification in our procedure consists in cutting the urinary conduit, not at its narrowest point, near the uretero-pelvic junction, but well up on the pelvis. This will provide a wide lumen at the line of suture, lessening the chances of obstruction of any kind developing in the post-operative period. Two sets of differently coloured stay sutures are inserted at each side of the flattened pelvis at the point selected for section, and the pelvis cut boldly across, between the two sets of stay sutures. The lower portion of the sectioned pelvis and ureter is then drawn down and placed in contact with the upper portion of pelvis, in front of or behind the vessel as the case may be. The stay sutures ensure accurate approximation of the united portions of pelvis without torsion. A single line of fine catgut sutures is inserted, on the two aspects, anterior and posterior. Drainage of the kidney pelvis has been used in one case only. The wounds were drained with cigarette drains which were removed in twenty-four to forty-eight hours. There is no reason why a nephropexy should not be performed at the same time. Ordinarily, the striking relief of obstruction resulting from the altered change in the vessels' position, obviates the need for any other procedure. Although nephrostomy was done in one case only, it is quite possible that there is an addi-

tional safety in this procedure, which will outweigh the comfort of a perfectly dry wound.

We have indicated that the advantage of our modification is to be found in the wide ostium which is secured. Walters, in a report of three cases, in which a "transplantation or reimplantation of the ureter into the pelvis" had been done, stated that a secondary plastic operation had been necessary in two cases, in order to remove a valve-like portion of the ureter which obstructed the lumen of the new ostium. Such a happening is hardly likely to occur, when a wider area of pelvis is selected for the point of section. Apart from this, the danger of infection is greatly decreased.

It is somewhat difficult to suggest a name which will correctly designate the operation. The term first used, ureteropyeloneostomy, implies a new ostium. This is quite correct in the case of the Gregoire-Quinby procedure. The terms "transplantation" and "reimplantation" are not so acceptable. It may be more properly applied to our modification, where the sectioned pelvis is restored to its original site, or reimplanted. The term "transposition" has also been used. Perhaps a combination such as, section of the pelvis with reimplantation, or with transposition, will furnish the most satisfactory description.

The modified operative procedure we have described has been performed by us in eleven cases. The first operation was performed in 1928, in a boy of 9, the youngest in the series. The oldest was aged 42. The average age was 26.7. Ten were males; only one was a female. Eight were on the right side, three on the left. In only one (No. 6) was a nephropexy performed at the same time. In the earlier cases, this was purposely omitted, in order not to cloud the issue, or leave any doubt as to the procedure which was playing the beneficial rôle. So far as we can tell, the results were entirely favourable. In only one case was there transient leakage. In only one case was drainage more than superficial and of the wound only. In one, a nephrostomy was done. This was the only case in which the operation was not performed by the senior author.

One of the patients successfully operated upon had a voluminous hydronephrosis, 800 c.c. being aspirated from the pelvis. This has been described in a previous communication, from which the following quotation is taken. It

concerns a boy of 16, who had suffered from severe left sided renal pains for six years.

"There was a large ballottable mass in the left renal area. Intravenous pyelography showed an absence of any kidney shadow on the left side. A catheter passed up the ureter was deviated markedly outwards. No urine could be secured, and a retrograde pyelogram was unsuccessful, as no fluid entered the kidney. Operation revealed a large hydronephrosis, with a huge pelvis, sharply demarcated above an aberrant vessel in front of the ureter, apparently arising from the aorta. The ureter was collapsed below the vessel. Urine could, with difficulty, be squeezed from the pelvis down the ureter. On the other hand, there was a considerable amount of renal substance, even if thinner than normal. It was felt that the vessel was too large to cut, and the kidney too good to be sacrificed. After aspirating 800 c.c. of urine from the pelvis, it was not difficult to carry out the operation, to section the pelvis, bring down the lower segment of pelvis and ureter behind the vessel, replace it in front of the vessel, and re-unite the pelvis by suture. It was satisfying to see the flow of urine down the ureter, immediately after the suturing was completed. The operation was done on April 18, 1935. The patient was discharged perfectly well on May 8th. An intravenous pyelogram taken before his discharge showed that there was a satisfactory renal function, though the kidney was still hydronephrotic. The patient was re-examined on August 8th. He had been continuously free of pain since the operation. An intravenous pyelogram on that date showed evidence of increased renal function and drainage on the operated side, though only a slight reduction in the size of the hydronephrosis."

The patient was reported, 18 months after operation, to have been continuously free from pain.

Our attention and interest in this presentation have been centred on the group in which the plastic procedure described above has been employed and not upon a much larger group in which various other operations were performed. Nephrectomy has been carried out because of varying degrees of renal atrophy, the result of vessel obstruction and we are convinced that a more conservative type of surgery could and should have been employed in some cases. Other operations, nephropexy, section and ligation of the vessel, and sundry minor interventions have also been used, with varying degrees of success.

In summing up, we cannot do better than to amplify the advice given by Quinby in 1922, relative to the treatment of aberrant renal vessels which obstruct the urinary passages.

1. Ligation and section of the vessel is justified in those instances in which the vessel is demonstrated by observation to be insignificant.

2. Nephrectomy should be performed only if the kidney is valueless and devoid of function.

3. Other cases should be treated by a plastic operation which effectively removes the obstructing agent, allays infection, checks the

spread of the hydronephrotic process, and conserves the kidney. This objective is best achieved by section of the ureter or pelvis and reimplanting or transplanting it in such a way that further obstruction by the vessel is prevented.

4. Further experiences with the modified plastic operation one of us proposed twelve years ago, have convinced us that it is an easily performed, and a safe and satisfactory procedure.

5. The advantage of early conservative renal surgery is unquestionable, and a more extensive use by urologists and adequate and appropriate plastic procedures for the relief of hydronephrosis caused by aberrant vessels is both feasible and desirable.

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RÉSUMÉ

Les vaisseaux rénaux aberrants existaient dans 21 pour cent de 1,237 reins autopsiés. Ces vaisseaux produisent souvent de l'hydronephrose, notamment ceux qui siègent au pôle inférieur et au hile. La ligature simple du vaisseau, à moins qu'il soit de très petit calibre, n'est pas recommandée, car elle amène souvent des complications. Les néphropexies ne résolvent pas le problème. La néphrectomie ne doit être envisagée que lorsque le rein n'a plus de valeur fonctionnelle. Le but de l'opération est la disparition de l'hydronephrose et la libération des voies urinaires obstruées; ce but peut être atteint par les opérations plastiques. Le procédé de Grégoire fut le premier à obtenir la faveur de nombreux urologistes. Nous avons modifié ce procédé en sectionnant l'uretère plus haut, au début du bassinnet, de façon à suturer un tube dont la lumière est beaucoup plus grande. L'union de l'uretère au bassinnet est faite en avant ou en arrière du vaisseau aberrant. Il s'agit, en somme, d'une section du bassinnet avec réimplantation ou avec transposition. Notre technique a été employée avec succès chez onze malades. Il faut bien avoir à l'esprit tous les avantages que comportent pour l'avenir d'un rein l'opération plastique précocée qui empêchera presque toujours l'hydronephrose.

JEAN SAUCIER

SURGICAL TREATMENT OF STRABISMUS*

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CASES of strabismus are usually first seen by the family doctor or pædiatrician and it is important that they should give proper advice to the parents. Some years ago that advice was, "Leave it alone until they are fifteen and they will grow out of it". Now, however, it is generally accepted that treatment of strabismus should be completed before school age so that the child is not handicapped by a physical defect which might affect its whole life. Most authorities are agreed that treatment should begin early and if an operation is necessary it should be done before school age. The chances of cure and good binocular vision are much better if this is done. If treatment is delayed, amblyopia usually develops.

The arguments against early treatment are usually: 1st, fear of an anæsthetic, but this would apply to any surgical procedure; 2nd, if an operation is done early, the eye may turn out later. When tenotomies of the internal rectus were in vogue, this was often the case, but now with improved technique and proper diagnosis, the fear of the eye turning the opposite way has been largely eliminated. Orthoptic training has its place to develop binocular vision and in conjunction with operation, but it is not a cure-all.

The most important step in treatment is the correct diagnosis. Each case must be thoroughly examined several times before a definite opinion can be given as to the underlying cause. It will be found that the condition will vary from day to day and is influenced by the patient's general condition. Fatigue usually makes strabismus more pronounced. This is particularly noticeable in esotropia and hyper-tropia in children. The parents may notice the eyes turn at home, particularly in the evening, while on repeated visits to the doctor the eyes will be straight.

Spasms of individual muscles vary, particularly those of the inferior oblique and they must be carefully sought for. Babies' eyes often do not coordinate until they are several months old. Crossed eyes should not be

neglected after twelve months and treatment should begin as soon as possible after the age of fifteen months. A concerted effort should be made to have the child's eyes straight before school age. Some cases do not develop until the age of two or three years and treatment should be started as soon as it is noticed.

It is my purpose to outline the various tests used in diagnosis in the treatment of strabismus, with special regard to surgical treatment. This paper is based on a series of about 800 cases seen at the Hospital for Sick Children, Toronto, in which some surgical procedure was done in about 25 per cent. Simple tests to determine if the child's eyes are crossed which can be used by a general practitioner or pædiatrician are outlined.

DIAGNOSIS

It is important that one should have a thorough understanding of the various tests used in diagnosis of strabismus. Many failures in treatment are due to the fact that the examiner was unable to determine the underlying cause. The methods used in diagnosis are: (1) corneal reflex test; (2) screen and parallax; (3) Excursion test; (4) convergence near point; (5) prism convergence, and divergence; (6) diplopia plotting; (7) Maddox rod; (8) refraction.

1. *Corneal reflex test.*—The general practitioner or the pædiatrician is often asked, "Doctor, are my baby's eyes straight?" Sometimes it is difficult to determine if strabismus is present. The bridge of the nose of many babies is very wide so that it covers the sclera medial to the cornea giving the appearance of crossed eyes. The corneal reflex test is used to determine if the eyes are straight. The examiner should shine a flashlight into the baby's eyes about fifteen inches from its face and observe the corneal light reflexes in each pupil (see Figs. 1, 2, 3 and 4). A baby will usually look at the light. If the eyes are straight, the reflex will be in the centre of each pupil but if they are crossed it will be in the centre of one pupil and towards the edge of the cornea in the other. In children under a year little more can be done.

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2. *Screen and parallax.*—The screen is the objective and parallax the subjective test. It is taken at thirteen inches and twenty feet. The patient looks at a small light or the head of a white pin thirteen inches from the eye. The examiner covers one eye with a card and moves it quickly from one eye to the other. Watch the eye to be uncovered. If the eyes are normal there is no movement, but if there is a muscle imbalance the eye will swing towards the light as it is uncovered. With esophoria or esotropia the eye swings out and in exophoria or tropia it will swing in. To differentiate a phoria from a tropia cover one eye then uncover it. If the eye swings into line with the other, it is a phoria, if not, a tropia. Do this test in the six cardinal positions which are: (1) up and right; (2) up and left; (3) right; (4) left; (5) down and right; (6) down and left. The amount of deviation can be measured by putting prisms of various strengths in front of the eye until there is no movement. The prisms are square and held in the hand, care being taken to hold them straight and the surface of the prism nearest the eye should be at right angles to the line joining the test object and the eye. The same tests are done at twenty feet and measured.

3. *Excursion test.*—Partially cover one eye with a card and observe that eye while the patient follows the test object with the other eye; repeat the test with the other eye. In this way a spasm or paralysis can be elicited when the object is carried into the field of action of the affected muscle. If there is a nystagmoid movement in any field, suspect a weakness of the muscle acting in that field.

4. *Convergence near point* is the closest distance to the eye at which the patient still has fusion. It is normal at about 60 to 100 mm. from the eye, or 45 to 75 mm. from the bridge of the nose. The test object should be held at some distance from the eyes and slowly brought towards them. Watch for the point at which one eye swings out and note carefully which eye swings first, as that usually indicates which internal muscle is at fault.

5. *Prisms-convergence and divergence.*—A person should be able to overcome a prism base out at 30 to 60 diopters, but will only overcome about four to eight diopters base in. The prism tests, however, are not essential to diagnosis.

6. *Diplopia plotting with the tangent screen.*—This test can be done only if the patient is not

suppressing the image in the affected eye. The patient is seated one metre in front of a tangent screen and a red glass held over one eye. The most convenient test object is the light from a May ophthalmoscope with the condensing lens removed. The diplopia is plotted out in the six cardinal positions. If the eyes are normal there should be no separation of the light but when it is carried into the field of action of the affected muscle the red and white lights will separate.

7. *Maddox rod.*—This is a very common test but is of very little use in diagnosing muscle weaknesses. It is helpful in hyperphorias in prescribing glasses. One must remember that the hyperphoria may vary when the patient looks up or down and it should be checked in all fields.

8. *Refraction.*—A thorough refraction under cycloplegic should be done. The foregoing tests should be made with and without glasses.

Six different tests have been outlined to be used in the diagnosis of muscle abnormalities; sometimes only one or two can be used. In the case of small children, the screen and excursion tests are usually all that are necessary to make the proper diagnosis. Children often do not co-operate well enough to measure the deviation with prisms. A convenient method to measure the angle of deviation is to have the child look at a light held thirteen inches from the eyes. The corneal reflex will be in the centre of one pupil and eccentric in the other. Measure in millimetres the distance the reflex lies from the centre of one pupil of the deviating eye. This number multiplied by seven gives a rough approximation of the deviation and is usually about one-half the measurement by prisms. The cornea is approximately 12 mm. across, so that the mid-point is 6 mm. from the periphery. It is easy to divide this into various parts so that if the reflex appears to be about midway between centre and periphery, the squint is about 21 degrees and this is equivalent to about 35 prism degrees.

So much for the methods. How are they interpreted? Three types of strabismus are found: (1) convergent strabismus; (2) divergent strabismus; (3) hypertropia. The commonest condition dealt with is convergent strabismus or esotropia. There are several causes each requiring a separate type of treatment so that it is obvious each case must be thoroughly investigated to determine the under-

lying cause. Only then can proper treatment be applied. The causes are as follows: (a) convergence excess; (b) divergence weakness; (c) hyperphoria; (d) paralysis of an external rectus; (e) spasm of an internal rectus; (f) congenital anomalies.

(a) *Convergence excess.*—The commonest cause of convergent strabismus or esotropia is convergence excess accompanying hyperopia. At first the child's eyes turn in only when close work is done; later the eyes turn in more until finally one eye is constantly turned showing that a secondary divergence weakness has developed. The refraction should be done under complete mydriasis and if the child is old enough, the deviations for distance and near can be measured. It will be found that the findings for

be present and the condition is often bilateral.

(d) *Paralysis of the external rectus.*—This can be brought out by the screen and parallax, excursion test and diplopia plotting. It is usually secondary to some such disease as, infection of the petrous portion of the temporal bone, syphilis, or following an accident. It is unwise to attempt to do any surgical treatment until one is sure of the cause and no further improvement can be obtained by general treatment.

(e) *Spasm of the internal rectus* can be determined by diplopia plotting and the excursion test. It is not common and is usually secondary to a paralysis of either the opposite internal or external rectus of the same eye.

(f) *Congenital anomaly.*—Paralysis of any of the eye muscles may be congenital and it is

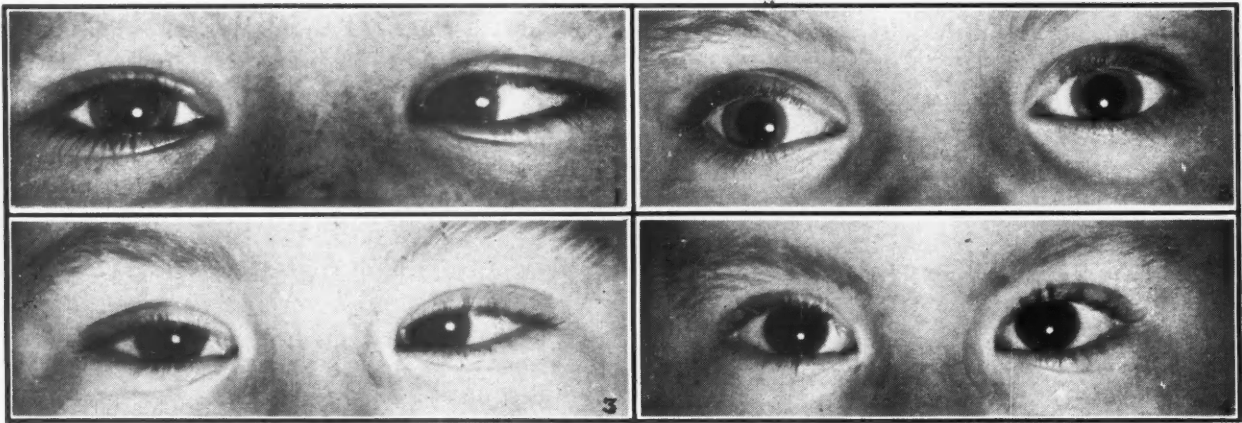


Fig. 1.—Esotropia or left convergent strabismus. Note light reflexes in centre of right pupil and at edge of iris in left eye. Fig. 2.—Exotropia or right divergent strabismus. Note light reflexes in centre of left pupil and to the inner side of pupil in the right eye. Fig. 3.—Esotropia of left eye. Fig. 4.—Same patient as in Fig. 3, three months after recession of left internal rectus muscle and resection of left external rectus muscle. Note light reflexes in same position in both pupils.

near will be greater than those for distance. It is important to determine if the deviation is the same in all directions of gaze. The near point of convergence is very close to the nose.

(b) *Divergence weakness.*—The tests for near are usually normal but when taken at twenty feet show marked convergence. Care must be taken to determine if the divergence weakness is due to a paralysis of the external rectus. This can be determined by muscle plotting and the excursion test.

(c) *Hyperphoria.*—This condition is often overlooked as a cause of convergent strabismus. The primary condition is often a partial paralysis of the superior rectus with a secondary overaction of the inferior oblique of the opposite eye. This is easily brought out by the excursion test when the eyes are brought into the field of action of the affected muscle. A head tilt may

usually easy to determine by the excursion test and diplopia plotting. Occasionally the external rectus is replaced by a fibrous band, giving rise to Duane's retraction syndrome. There is no outward rotation and on adduction the palpebral fissure is narrowed because the globe recedes inwards.

2. *Divergent strabismus or exotropia* is much less common than convergent strabismus. It occasionally accompanies myopia but is more often due to convergence weakness or a divergence excess. Occasionally it is secondary to hypertropia.

In convergence weakness the patient is unable to converge and the deviation for near is much greater than for distance. In divergence excess, convergence may be normal but in looking at distant objects the eye will wander out.

3. *Hypertropia.*—This is not common but

should always be looked for. It can usually be brought out by the excursion test and screen and parallax. The hypertropia will be much more marked in the field of action of the affected muscle.

TREATMENT

1. *Convergent strabismus*.—It is important to determine which is the fixing eye. Atropine ointment 1 per cent is put in the child's eyes three times a day for three days to relax the accommodation. Many accommodative cases of convergent strabismus will straighten with atropine and this usually indicates that glasses will hold the eye straight. If glasses are necessary, they may be put on as early as fifteen months and a full correction should be prescribed. Babies will wear them readily.

an operation must be considered, and I am of the firm opinion that this should be done before the child enters school, preferably at the age of two or three. If the operation is done early, fusion is accomplished much more readily. The psychological aspect is very important and should not be overlooked. Cross-eyed children have to suffer the jeers of their playmates and are sometimes considered below par mentally.

2. *Divergence weakness*.—This does not respond well to passive treatment and usually requires strengthening of the external recti by operation.

3. *Hypertropia*.—If slight this can be helped by vertical prisms but marked hypertropia usually requires operative interference before a cure is effected. The commonest type is spasm of the inferior oblique secondary to the paralysis

TECHNIQUE OF OPERATION FOR SHORTENING AN OCULAR MUSCLE

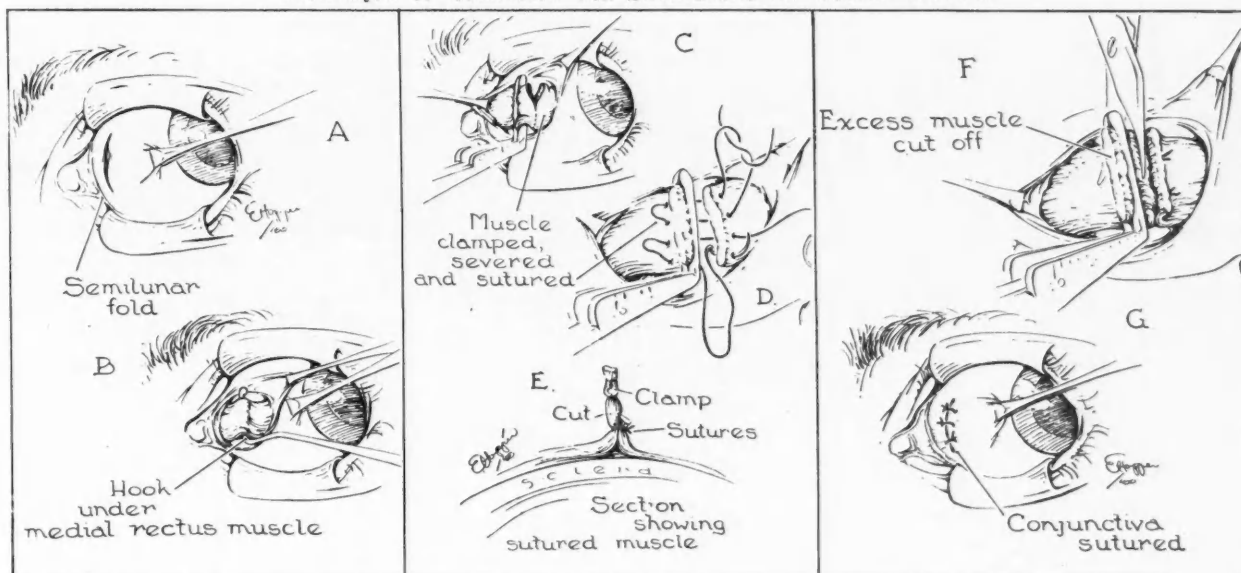


Fig. 5

Fig. 6

Fig. 7

Fig. 5A.—Conjunctiva grasped with fixation forceps. Incision through conjunctiva. **Fig. 5B.**—Rectus muscle picked up by muscle hook. **Fig. 6C.**—Clamp applied and muscle severed from the sclera leaving a good stump. **Fig. 6D.**—Two double arm 000 chromic catgut sutures put through muscle and stump. **Fig. 6E.**—Sutures tied showing how fibres are prevented from slipping. **Fig. 7F.**—Excess muscle cut off. **Fig. 7G.**—Conjunctiva sutured with interrupted sutures.

An effort must be made to make the patient use the turned eye. This can be done several ways: first: putting atropine ointment in the good eye once a day. This should not be continued for more than three weeks. Second: cover the good eye for several hours each day. An occluder on the glass may be sufficient but it is sometimes necessary to put on a firm adhesive bandage. Care must be taken not to carry on the treatment too long at one time or the good eye may become crossed and even amblyopic.

If the eyes still turn in despite treatment then

of the superior rectus of the opposite eye. Weakening of the inferior oblique by cutting out a piece of the muscle usually gives excellent results.

OPERATIONS

The most important step in any operative procedure is pre-operative diagnosis and determination of the underlying cause. Unless that is accurately determined before hand the operation has only a slight chance of success. As most cases of convergent strabismus are due to convergence excess, weakening the internal recti

gives good results but it is sometimes necessary to strengthen the external recti because of secondary divergence weakness.

(a) *Weakening operations.*—Tenotomy of the internal rectus is very uncertain and has been pretty well discarded. Procedures have been outlined for weakening the internal rectus by placing the insertion farther back. They are all based on the same principle of suturing the muscle to the sclera about four or five millimetres behind the original insertion. Jamieson's¹ recession is a very excellent operation and gives good results if properly done.

(b) *Strengthening operations.*—Many operative procedures have been devised for strengthening a muscle. They are divided into three main groups: (1) Resecting a piece of the muscle and re-attaching the tendon to the original insertion. (2) By tucking part of the muscle or re-arranging the fibres so that the muscle is shortened. (3) Advancement of the attachment. Each method is good if properly done and many surgeons have modified them to suit their individual needs. Some are more difficult to do and give more reaction than others. An eye surgeon should learn to do one type of operation well and if good results are obtained that is all that is necessary. An operation should not be condemned just because it fails in the hands of one surgeon. I have developed a method of doing a resection by which I have obtained very good results. It seems to give more correction and overcomes some of the difficulties encountered in other types of operations. No claim of originality is made and apologies are offered if it may appear the same as another's original technique.

TECHNIQUE OF OPERATION FOR STRENGTHENING INTERNAL AND EXTERNAL RECTI.

The conjunctiva is picked up about 10 mm. from the limbus and an incision about 7 mm. long made parallel to the limbus (Fig. 5A). Tenon's capsule is picked up below and an incision made through it. The muscle hook is introduced to pick up the muscle. No effort is made to freely dissect the muscle, as a better result is obtained if as little dissection as possible is done (Fig. 5B). The muscle clamp is applied and the muscle cut from its attachment leaving enough of the tendon on the sclera to secure the sutures (Fig. 6C). Two double arm 000 catgut sutures are put in the muscle from the outside surface to the inside, medial to the clamp. The exact position is determined by the amount of resection one desires (Fig. 6D). While the assistant holds the muscle clamp, the sutures are put through the muscle clamp, drawn up tightly and tied. The necessary pulling is done by the muscle clamp and not by the sutures, so there is no tendency for the sutures to split muscle fibres and pull along the length of the muscle. When the sutures are tied, the tight loop clamps the muscle fibres together, so that there is very little danger of post-

operative movement causing the muscle to pull through the sutures (Fig. 6E). The cut fibres seem to adhere to the original stump even though they are not in exact apposition. The excess muscle is cut off, still in the clamp, and the conjunctiva is closed with interrupted sutures (Figs. 7F and 7G). The eye is bandaged for ten days. The reaction usually subsides in three or four weeks.

Good results have been obtained in cases of convergence weakness in which the patient could not converge at all. A resection of the internal rectus gave good convergence power. No bad effect has been observed in burying the catgut in the conjunctiva. Sometimes there is more reaction than with silk but if care is taken to soak the catgut in saline after it is removed from the capsule, it is easier to handle and the reaction it causes is less.

Many surgeons advocate delaying the operation until it can be done under local anaesthesia. I believe this to be absolutely wrong. If the surgeon has to determine how much he should do by the appearance of the eye while he is operating, he will be destined to many failures. The patient is usually under a sedative and the muscle action is partially paralyzed due to operative trauma and local anaesthetic. The amount and type of operation should be determined beforehand, and then, if necessary done under a general anaesthetic. Two hundred cases, including adults and children have been done under a general anaesthetic and the results have been consistently good, so that it is not necessary to put the patient through a very uncomfortable and sometimes nauseating procedure with a local anaesthetic.

CONCLUSIONS

(1) Proper diagnosis is most important in obtaining good results in the treatment of strabismus. (2) Too much emphasis cannot be placed on the importance of early treatment. No child should be allowed to go through school with crossed eyes. (3) If an operation is necessary it should be done before school age, and it is much easier under general anaesthesia. (4) The technique in detail is given for strengthening an ocular muscle. (5) No exact rules can be given for treatment or operative procedure. There is a great individual variation in cases of a similar type. As in all branches of surgery, good judgment and common sense are prerequisite.

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THE RADIOLOGICAL CONSIDERATION OF COARCTATION OF THE AORTA (ADULT TYPE)*

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INTEREST in coarctation of the aorta has recently been stimulated by seeing two cases of this relatively rare condition during the past year. Only 7 cases have been recorded at the Toronto General Hospital in the past thirteen years. Two of these were recognized only at autopsy; 4 of the remaining five cases presented characteristic radiological changes which enabled a positive diagnosis to be made.

In this presentation it is proposed to deal only with the adult or acquired type of coarctation, in which a partial or complete obstruction of the lumen of the aorta is met with in the region of the aortic isthmus, at or below the entrance of the ductus arteriosus. This is distinct from the infantile or congenital type which is generally regarded as being incompatible with life. On the other hand, the adult type may be compatible with many years of life, symptom-free. Cases are recorded where no symptoms referable to the condition have appeared, the patient dying of some extraneous cause.

The condition occurs twice as frequently in males as in females, and it has been estimated by Blackford⁴ that it is encountered in 1 of every 1,550 autopsies.

The etiology is not definitely known, although the general consensus is that it is the result of an abnormal extension of the tissue peculiar to the ductus arteriosus into the aortic wall, and with the contraction of this tissue at birth there is a simultaneous stenosis of the ductus arteriosus and the aorta (Gray⁸). It has also been suggested that the constriction is due to a developmental defect of the left 4th and 5th aortic arches. Because of this constriction an extensive collateral circulation is established between the left subclavian and innominate arteries, and the internal mammary, intercostals, and dorsal scapular arteries; the internal mammary, in turn, connecting with the deep epigastric and the aorta.

It is interesting to note that Morgagni is credited with having first described this condition anatomically in 1760, and although numerous articles have been written on the clinical aspect since that time, it is only within the past 12 years or so that roentgenological examination has been recognized as a valuable adjunct to diagnosis. In fact, the diagnosis may be made on radiological examination only, independent of any clinical history or physical examination.

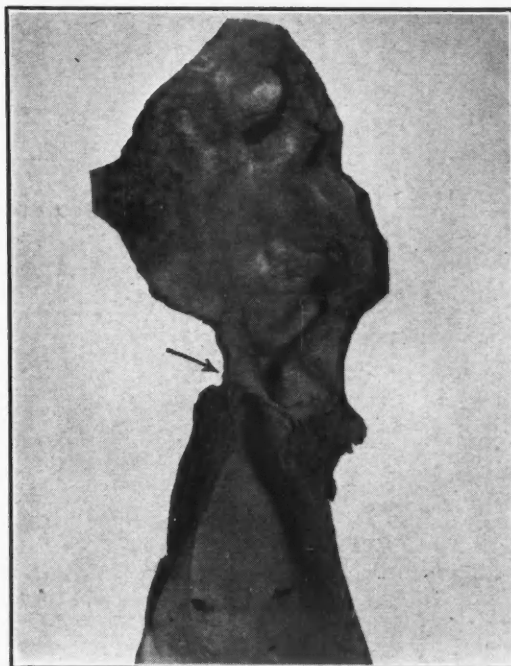


Fig. 1.—Anatomical specimen. Site of coarctation indicated by arrow.

In view of this it is rather surprising to find that with the exception of the article by Railsback and Dock¹³ in 1929 and Fray⁶ in 1930, radiological literature, including the standard textbooks, contains so little information regarding this condition and its diagnosis. Baker and Sheldon² in 1936 state that less than 350 cases of coarctation of the aorta are described in the literature; of these less than 25 per cent were diagnosed by clinical means.

CLINICAL MANIFESTATIONS

Clinical symptoms, when present, are often those of hypertension, and may also include

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præcordial pain, headache, dyspnœa, vertigo, etc. Cases have also been recorded in which intermittent claudication of the lower extremities is present, or the patient may complain only of coldness of the lower extremities.

Briefly the clinical manifestations on which a diagnosis may be made are:

1. Evidence of collateral circulation. This consists of visibly or palpably enlarged tortuous intercostal arteries, most commonly detected in the space between the dorsal borders of the scapulæ, and immediately below the inferior angles of the scapulæ. Large pulsating vessels may also be noted in the neck and palpated in the suprasternal notch.

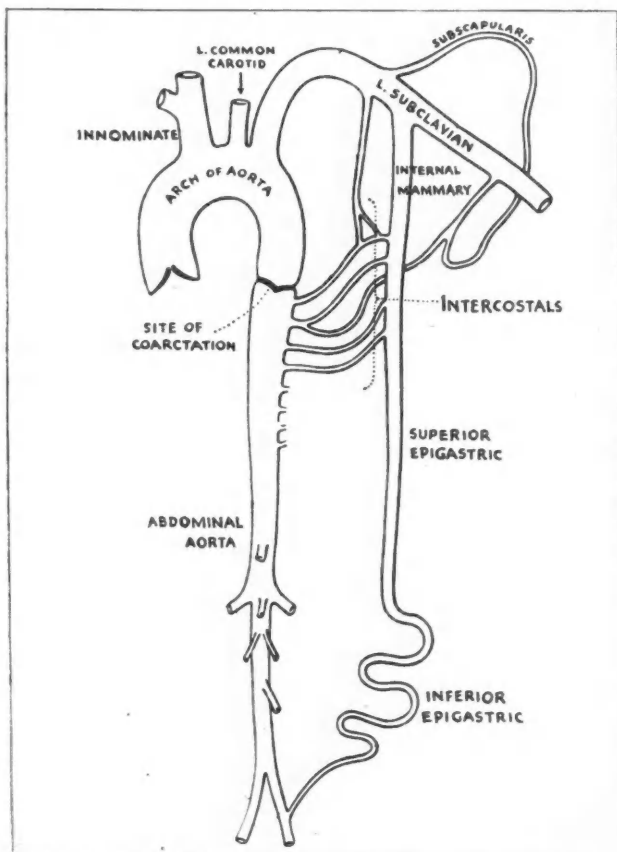


Fig. 2.—Diagrammatic representation of collateral circulation after Gitlow and Sommer.⁷

2. Feeble or absent pulsation in the abdominal aorta, femoral arteries and the arteries of the lower extremities.

3. A marked discrepancy in the blood pressure readings in the upper and lower extremities. Normally blood pressure readings in the upper and lower extremities are about the same, or slightly higher in the lower extremities, whereas in coarctation the blood pressure reading is either markedly reduced or not obtainable in the lower limbs.

4. Atypical murmurs and thrills which may be associated with the heart, but which usually originate in the enlarged engorged vessels.

5. Hypertension; with very few exceptions cases of coarctation of the aorta present high blood pressure; this applies to both systolic and diastolic readings (Lewis¹²). It is interesting to note also that Lewis in checking patients in the hypertension clinic discovered five cases of coarctation of the aorta which had previously been diagnosed as essential hypertension.

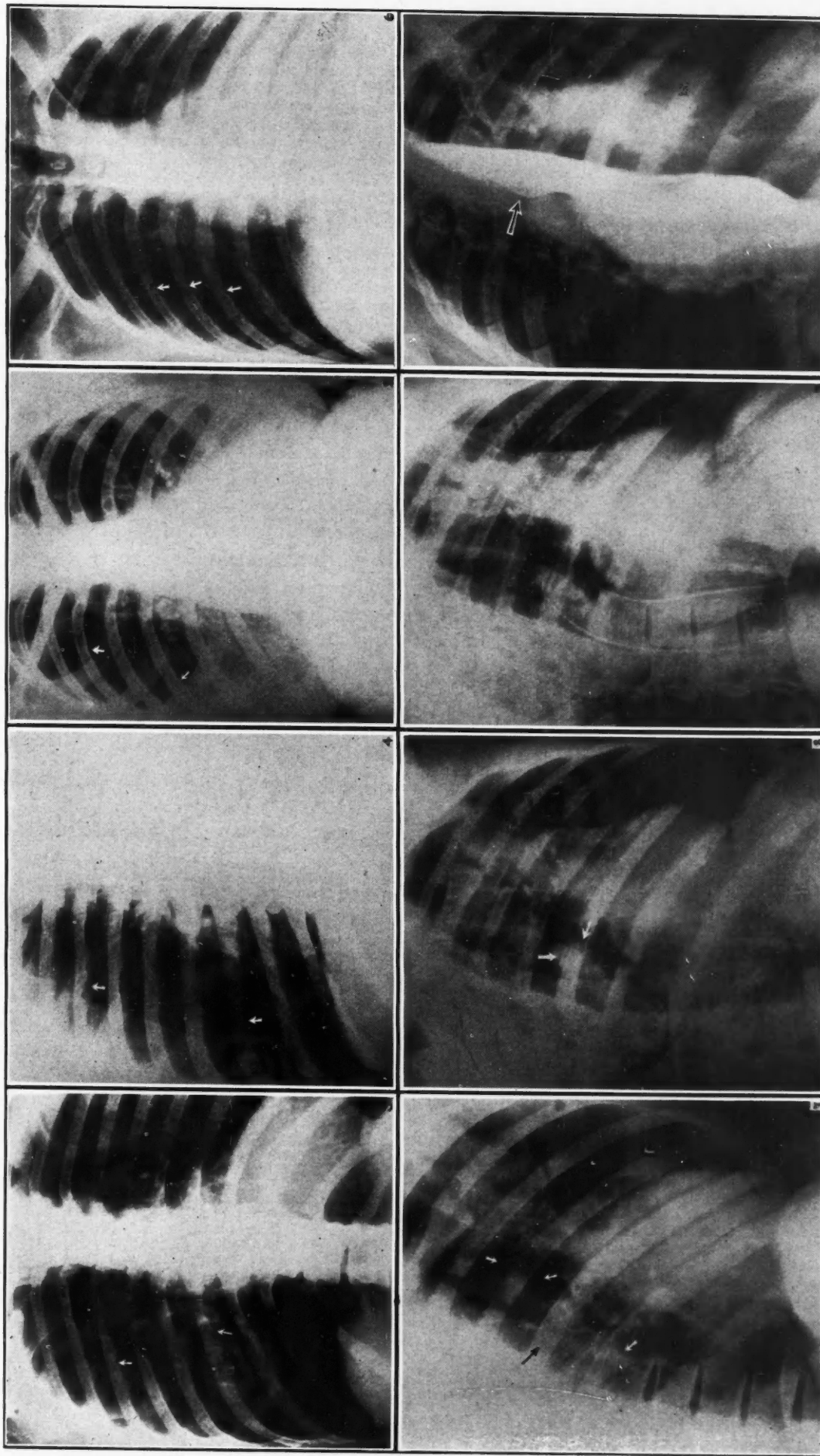
RADIOLOGICAL DIAGNOSIS

The evidence on which a radiological diagnosis can be made may be divided into two types, namely: first, those changes on the basis of which a positive diagnosis can be rendered, and; secondly, those changes which provide confirmatory evidence or a suggestion of the presence of the condition.

A. *Changes on which a positive diagnosis can be made.*—(1) Erosion of the ribs is the most readily recognized feature of the condition, cases having been recorded in which it has been present as early as five years of age. It is most commonly seen in connection with the 4th to 9th ribs, and appears as a smooth, curved notching or indentation along the inferior aspect of the ribs, particularly in their posterior portions, without other evidence of bone change being apparent. The correlation between the anatomical erosion of the ribs by enlarged, tortuous, intercostal arteries and the x-ray findings was first determined by Railsback and Dock.¹³

2. Constantly present, but more difficult of demonstration, is the narrowing or complete absence of a portion of the aorta in the region of the isthmus. This may be shown in the left postero-anterior oblique view, that is, with the left chest nearest the film, in which position the left clavicle will be roughly parallel to the cassette. It will be found that fluoroscopic examination prior to the taking of films is valuable in determining the exact degree of obliquity necessary, which may vary between 30 to 60 degrees of rotation. The defect may sometimes be more readily visualized by outlining the œsophagus with barium, or by the intravenous injection of diodrast solution.

B. *Suggestive or confirmatory evidence.*—(1) Normally in the adult a prominence is seen in connection with the aortic shadow (the aortic knob), extending to the left of the spine at



(see case report).—Postero-anterior radiograph of chest showing typical erosions of posterior aspects of the 5th to 9th ribs on both sides. Absent aortic knob and left ventricular hypertrophy provide confirmatory evidence. **Fig. 7.** Case 4.—Left posterior oblique view showing interruption in continuity of aortic shadow in region of isthmus. **Fig. 8.** Case 4.—Fig. 7 (retouched). **Fig. 10.** Case 4.—Esophagus filled with barium, showing a bulge rather than the usual indentation in the region of the aortic isthmus.

Fig. 3. Case 1.—K.H. Postero-anterior radiograph of chest showing characteristic rib erosion involving 4th to 9th ribs posteriorly on both sides and left ventricular hypertrophy. **Fig. 4.** Case 2.—C.S. Admitted to hospital for surgical treatment of tuberculosis of left lung. Postero-anterior radiograph of thorax showed erosion of 4th to 9th ribs posteriorly on the right side. The left ribs and heart are obscured by pulmonary disease. **Fig. 5.** Case 3 (see case report).—Postero-anterior radiograph of chest showing erosion of 5th to 7th right ribs posteriorly and 5th to 9th left ribs posteriorly. Some widening of ascending aorta to right with enlargement of left ventricle. **Fig. 6.** Case 4

about the level of the 6th thoracic vertebra, and marking the site of the aortic isthmus. Generally this becomes more prominent with advancing years. In younger subjects, however, this shadow may not be seen. As the isthmus is the site of the constriction in coarctation the aortic knob will be absent in such patients and provide confirmatory evidence of the condition in the older age-groups, but due to the normal variability this is not in itself sufficient evidence on which to base a diagnosis. (2) Left ventricular hypertrophy may or may not accompany coarctation, and, if present, the heart shadow only shows a moderate degree of enlargement, as such enlargement is usually due to hypertrophy rather than dilatation. (3) There may be some widening of the ascending aorta but this is not a constant finding. (4) Similarly, there may be an increase in width of the shadows produced by the great vessels going to the neck, due to their widening or dilatation.

The following two case reports are submitted.

CASE 3

J.A.T., white female, aged 19, admitted to hospital February, 1940, complaining of dull præcordial pain and slight exercise intolerance during the previous three years; for the past year complained of sharp, stabbing, retrosternal pain, radiating to the back and down the left arm, with marked increase in exercise intolerance, dyspnoea, œdema of extremities, and fatigue as well as frontal headaches.

Physical examination.—A healthy, young female, with no apparent cyanosis, no palpable or visible vessels over the posterior thorax. Palpable, pulsating vessels were present along the right clavicle and in the suprasternal notch with associated thrills. Systolic and diastolic murmurs were heard throughout the præcordium and over the vessels of the back and neck. Blood pressure in the upper extremities 180/80; in the lower extremities could not be obtained. The femoral pulse was very weak; the heart showed some enlargement.

Radiological examination.—The postero-anterior radiograph of the chest showed characteristic erosion of the posterior portions of the 5th to 7th ribs on the right side and the 5th to 9th ribs on the left. There was some widening of the ascending aorta to the right with enlargement of the left ventricle. The absent aortic knob may not be of great significance due to the patient's age.

CASE 4

J.A.F., white male, aged 23, admitted to hospital November 19, 1940, complaining of convulsive seizures of two weeks' duration, with throbbing frontal headaches, and epigastric distress of 1½ years' duration. No history of œdema, cyanosis or exercise intolerance.

Clinical examination.—A well developed, healthy, young male, with no evidence of cyanosis. The heart was somewhat enlarged, with systolic murmurs heard over the whole præcordium and over the posterior

chest wall. Visible dilated tortuous vessels were present over the back and in both axillæ, with palpable pulsating vessels in the neck and the suprasternal notch. The femoral pulsations were weak; blood pressure in upper extremities 220/120; in lower extremities 130/110.

Radiological examination.—The postero-anterior chest film showed typical rib changes, i.e., indentations along the inferior margin of the posterior portions of the 4th and 9th ribs on both sides. The aortic knob is absent. Evidence of left ventricular hypertrophy was apparent. The postero-anterior left oblique radiograph showed a break in the aortic shadow in the region of the isthmus. Further confirmatory evidence was noted with the œsophagus filled with barium, in that, instead of the usual indentation in the œsophagus in the region of the aortic isthmus, a bulge is apparent corresponding to the defect seen in the aorta and indicating the site of the coarctation.

SUMMARY

A review of the radiological findings in four cases of coarctation of the aorta (adult type) together with a brief summary of its anatomy and clinical signs and symptoms is presented. It is wished to emphasize the following radiological signs on which a diagnosis of coarctation of the aorta can be made.

A. Evidence on which positive diagnosis can be rendered: (1) erosion of ribs; (2) demonstration of an area of constriction in the aorta.

B. Suggestive or confirmatory evidence: (1) absence of aortic knob; (2) cardiac enlargement; (3) widening of ascending aorta; (4) increase in width of shadow cast by vessels going to the neck.

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CHEMOTHERAPY OF MENINGOCOCCIC MENINGITIS*

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THIS paper is a clinical analysis of a small group of young patients with acute meningococcic meningitis, and it also includes a study of the changes in the spinal fluid throughout treatment with sulfapyridine and soludagenan given intramuscularly. There were 14 patients, 10 of whom were under six years of age. All were treated on the infectious ward of the War Memorial Children's Hospital during the past year and all but four during the winter months. They came from widely separated parts of western Ontario. The first four received serum and sulfapyridine and the other ten received sulfapyridine and soludagenan alone.

SIGNS AND SYMPTOMS

The suddenness of onset of the symptoms is characteristic of this disease. The degree of pyrexia is of little value as a guide to the seriousness of the infection. Eleven of the patients had a temperature of 101° F. or less on admission and three of them appeared almost moribund. Three older patients complained of intense headache during the first day or two of their illness. From the younger patients, naturally, this information could not be obtained. However, their extreme irritability and restlessness may have been a manifestation of intense headache. Vomiting was an early symptom and was present in every patient, but after the first two or three days of treatment it usually subsided. The youngest patient, a three months old infant, had been vomiting for five days previous to admission to the hospital and in addition she had been having frequent loose stools. Due to the resulting dehydration the anterior fontanelle was sunken, not tense or bulging as is so often claimed in this disease.

Rigidity of the neck in varying degrees was present in all the patients, and when one attempted to bring the head forward it undoubtedly caused great pain, as the child with

a cry would immediately raise his hands to his head. Head retraction and opisthotonus were noted on admission only in three patients and in them symptoms had been present for three days or more previous to admission. A certain degree of muscular rigidity, which was most noticeable in the back and extremities, was present in all the patients and was usually the last symptom to disappear completely. Any movement of the body or limbs appeared to cause acute pain. Some of them exhibited a coarse tremor. Delirium was a common symptom, and some were unconscious on admission and medication or fluids could not be given by mouth.

Four of the 14 patients had the purpuric and petechial rash characteristic of meningococcic septicæmia.

COURSE AND COMPLICATIONS

The average duration of active symptoms in the patients treated with serum was two to three weeks or longer, and not infrequently the meningococcus was found in the spinal fluid a week or ten days after the administration of serum. Now, with chemotherapy the average duration of the symptoms is a week to ten days. The clinical picture was completely changed in most of our patients within twenty-four to forty-eight hours after the initial lumbar puncture and the commencement of treatment. The irritability and restlessness disappeared; the vomiting subsided and fluids could be given by mouth. They became rational and appeared much "easier". However, one did not improve clinically for five to six days, though the spinal fluid showed marked improvement, as evidenced by the rapid fall in cell count and by the fact that all spinal fluid was reported sterile after twenty-four hours of treatment with sulfapyridine.

None of the patients had convulsions at the onset of the disease, but two had, towards the end of the first week. With one, the convulsion appeared to be entirely right-sided, resulting in a right-sided monoplegia, the right arm being paralyzed and also the right side of the

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face. This paralysis was only temporary and had practically cleared in a week's time. The other patient who had a convulsion was the three months old infant, but no complications developed. One of the patients had been ill for five days previous to admission to the hospital. The cell count in his spinal fluid was reported as 86,000 per c.mm. He developed a left-sided hemiplegia five days after admission. This paralysis was slow in clearing. However, when he was returned to the hospital for an examination six weeks later nearly all the signs of weakness in the left leg had disappeared. The arm had a return of normal movement and power some weeks earlier. One patient had a marked strabismus on admission which disappeared in about ten days. There were no other complications.

The one fatal case in this series was a three year old boy, whose symptoms had been present for some days previous to admission, at which time he was unconscious, cyanosed and appeared extremely toxic. His temperature was 104° F. He had marked head retraction and opisthotonus. As the hours went by he developed extreme abdominal distension which could not be relieved. The signs of irritation became even more marked and he died on the second day in hospital. The meningococcus was obtained on culture of the spinal fluid withdrawn at the diagnostic lumbar puncture, and the cell count was between five and six thousand. In the eighteen hours preceding admission to the hospital he had been given 90 grains of soludagenan intramuscularly, which might be considered a heavy dose. On admission a second lumbar puncture was done and the cell count was about the same. The fluid was reported sterile on culture. The sulfapyridine estimation was reported as 20.4 mg. per cent. Soludagenan was discontinued for some hours and then was given in only five grain doses. A third lumbar puncture was done eighteen hours after admission and the cell count was down to two thousand in the spinal fluid and it was sterile on culture. The sulfapyridine estimation on this specimen of spinal fluid was 13 mg. per cent.. At the post mortem examination, the intestinal distension appeared to be due to toxic paralytic ileus. The various viscera showed toxic changes and pronounced venous congestion. There was no septicæmia.

The patient previously mentioned who did not show signs of improvement clinically until to-

wards the end of the fifth day, in whom, in fact, the signs of cerebral irritation became more marked and who remained unconscious all this time, showed marked improvement in her spinal fluid. The cell count fell from 37,000 to 122 per c.mm. in seven days. This was the first patient in this series and an estimation of the sulfapyridine level in the spinal fluid was not made until the fourth day of treatment when it was found to be 22.2 mg. per cent. The dosage of soludagenan was cut in half, and the following day the sulfapyridine estimation in

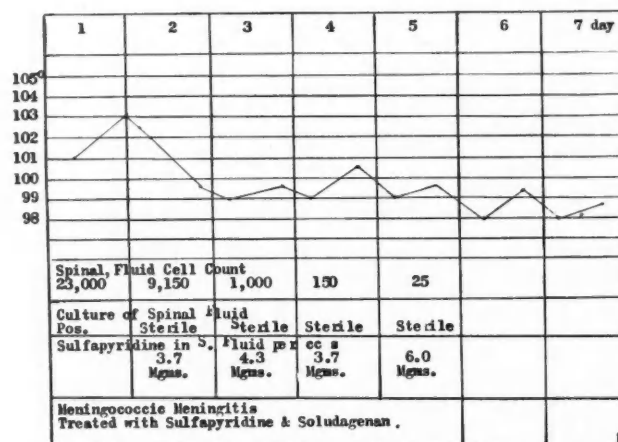


Chart 1.—Usual clinical course with chemotherapy. Sulfapyridine in spinal fluid per 100 c.c.

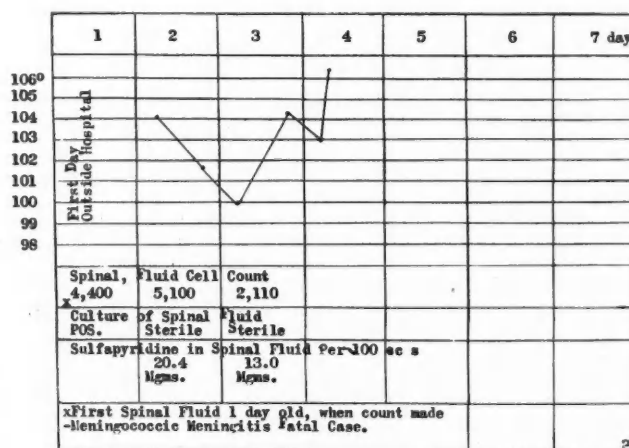


Chart 2.—Fatal case.

the spinal fluid was reported as 18.7 mg. per cent so the drug was discontinued. That evening the child regained consciousness and from then on made a speedy recovery.

Johnstone of Plymouth, England,¹ in a series of 70 cases of meningococcal meningitis, reported 5 patients, all children, who showed cerebral symptoms occurring during sulfapyridine treatment, and suggested that these might be due to heavy doses of sulfapyridine or to an individual sensitivity to the drug. The symptoms closely

simulated those of acute meningitis and might in error be looked upon as due to the infection. In his opinion it was a toxic reaction and might lead to a fatal issue if not recognized and the administration of the drug immediately discontinued. He pointed out that the average patient with this infection responded so quickly to sulfapyridine that if cerebral symptoms persisted or became more severe when the spinal fluid was rapidly returning to normal, then we should suspect a toxic reaction to the drug and at once discontinue treatment. The rapid improvement in the patients upon withdrawal of the sulfapyridine was in his opinion a strong point against the infective origin of the cerebral symptoms. Two of his patients died; the other three recovered rapidly upon discontinuance of treatment.

It is possible that the two cases described in this paper at some length were similar to the five cases reported by Johnstone. If this is true the value of the estimations of sulfapyridine in the spinal fluid is apparent.

TREATMENT AND DOSAGE

There is a marked difference of opinion as to the relative merits of the different derivatives of the sulfonamide group of drugs in the treatment of meningococcic infections. In Great Britain, especially in the Services, sulfapyridine is used orally and soluseptidine is used intravenously. Sulfapyridine was well tolerated by the infants and children of this series. Nausea and vomiting were only occasionally encountered. We have also found that children tolerate a large loading dose with safety, and this is the only way of obtaining an effective drug level in the spinal fluid rapidly if the drug is administered orally. The oral route is certainly the most convenient method of administration but occasionally we have been forced to use another method. We have used soludagenan intramuscularly, diluted in two to three times its volume of distilled water. Only one small slough developed in a large total of injections, and this in the three months old infant. With this method an effective drug level in the spinal fluid is rapidly obtained, and also by this method in many patients a fairly constant level of the drug in the spinal fluid can be maintained for the first four or five days of treatment. As a result, the clinical signs of infection disappear, the spinal fluid is reported as sterile,

and often we are able to discontinue treatment in five to seven days.

The dosage given to all patients in this series, regardless of age, was one grain per pound of body weight in twenty-four hours. This total was divided into six equal doses. However, in the first twenty-four hours they received more than that amount. The initial dose was doubled and the second dose was given in two hours' time, and from then on every four hours. After four or five days the same dose was given at intervals of six hours. If soludagenan were used we followed the same procedure. This enabled us to obtain an effective drug level in the spinal fluid rapidly. When using soludagenan our drug level was somewhat higher than when using sulfapyridine. This was of course to be expected as then we were not dependent upon varying degrees of absorption from the intestinal tract. If any difficulty were experienced in the administration of fluids by mouth to these patients, a 5 per cent glucose solution was given by means of a "continuous intravenous". Occasionally this solution was given interstitially. As sedatives, chloral hydrate, the barbiturates, and codeine were used.

CYTOLOGY OF THE CEREBROSPINAL FLUID

The cerebrospinal fluid obtained from these patients at the initial lumbar puncture showed varying degrees of turbidity and was under increased pressure except in those in whom the symptoms had been present for some days previous to admission. Here the fluid was almost too thick to flow through the needle. The cell count was 5,200 per c.mm. in one patient whose symptoms had been present for three to four days. Thus a low cell count in the spinal fluid does not necessarily mean that the lumbar puncture has been done at an early stage in the disease, as has been stated by some authors. A thirteen-year-old boy who returned from school in the afternoon complained of intense headache; in the evening he vomited a number of times. He was admitted to the hospital eighteen hours later and the cell count in his spinal fluid was 36,500 per c.mm. The cell count in the spinal fluid of these patients ranged from 5,000 to 40,000, with one exception. In this patient, who had been ill for six days previous to admission, the cell count was 86,000 per c.mm.

By doing a daily lumbar puncture it was possible to follow the rapid fall in the cell count of the spinal fluid. In most patients it

was considerably less than half in the first twenty-four hours and was down to less than fifty within five to seven days. In two there was an increased cell count within twenty-four hours, but by forty-eight hours the cell count showed a marked drop. The daily lumbar puncture also enabled us to check on the drug level in the spinal fluid each day.

BACTERIOLOGY

One patient had been given sulfapyridine for some hours previous to admission to the hospital, and no organisms were found in the direct smear of the spinal fluid and none grew on culture. However, this patient had a purpuric and petechial rash characteristic of meningococcal septicæmia, and as this is a strong presumptive evidence of a meningococcal infection this case is included in the series. The spinal fluid cell count was between five and six thousand per c.mm.

Gram-negative diplococci, some intracellular with morphology characteristic of the meningococcus, were found in the direct smears of the spinal fluid obtained from the initial lumbar puncture in 12 of the 13 other patients, and on culture the meningococcus was found in the spinal fluid of 11 patients, but all specimens of spinal fluid from these patients submitted for culture after the first twenty-four hours of treatment were reported as sterile. All cultures of the meningococcus were not typed, but those which were belonged to group 1.

DRUG LEVEL IN THE CEREBROSPINAL FLUID

Using the dosage of sulfapyridine outlined it was hoped that a concentration of 4 to 6 mg. per cent in the spinal fluid could be maintained for a period of five to seven days. This is the concentration advised by many authorities. Our estimations, however, varied considerably. In one patient the highest estimation was 3.2 per cent and this patient made a rapid recovery.

DISCUSSION

Some clinicians hold that a single diagnostic lumbar puncture is all that is necessary—that this procedure should not be repeated as a therapeutic measure unless symptoms such as headache and restlessness demand it. It is their opinion that repeated drainage lowers the drug level in the spinal fluid. This was not the case with our patients, where daily lumbar punctures were done. There are other factors which effect the drug level, namely, the marked individual

variation in the amount of absorption, excretion and conjugation of the drug. Some writers maintain that it is essential to obtain a high concentration of the drug as soon as possible in the treatment of this disease, but is a high level of the drug in the spinal fluid necessary to produce bacteriostasis? Many of us have seen a rapid response to treatment with a concentration of but 3 mg. per cent or less. Daily lumbar punctures were done on the patients of this series to enable us to study the changes in the bacteriology, cytology and drug level of the spinal fluid throughout the course of treatment. However, we believe repeated lumbar punctures should be done only if clinical symptoms indicate the necessity for it.

Until the introduction of the sulfonamide group of drugs meningococcal meningitis has been a much dreaded disease with a mortality rate of 30 to 60 per cent. Now, not only the treatment but the clinical course and the prognosis have been completely changed. Banks,² of London, England, reported a large number of patients with acute meningococcal meningitis from the civilian population, some of whom were treated with serum and sulfanilamide, some with sulfanilamide, and some with sulfapyridine. He concluded that, "Chemotherapy alone has been found to be fully curative and that serum as an auxiliary is neither necessary nor to be desired". He also reminded us that the administration of serum was somewhat troublesome and was not without certain risks. The mortality in his combined series (serum and sulfanilamide) was 12.3 per cent, while in his chemotherapy series it was 6.6 per cent. Cushing,³ using soluseptazine intravenously in 135 soldiers who had meningococcal meningitis in a military hospital in England, had but four deaths, a mortality rate of slightly less than 3 per cent.

Children with acute meningococcal meningitis, after a prolonged illness, have recovered without any treatment. Many children are alive today who had this disease and were treated with meningococcal antiserum or antitoxin. But with the introduction of chemotherapy in the treatment dramatic results have been obtained. The period of severe illness has been reduced to two or three days with most patients, and the spinal fluid has returned practically to normal within a week. The incidence of sequelæ has been reduced to a minimum and this is of extreme importance in children. No sequelæ have de-

veloped as yet with any of these patients but with some it is too early to exclude this possibility, especially the three months old infant. If a case is even suspected of being one of meningococcic meningitis treatment should be started, even before the diagnostic lumbar puncture has been done. The earlier in the course of the disease the treatment is started the shorter the clinical course will be and the better the prognosis.

It is not a mere coincidence that the mortality rate in a large number of patients with this disease being reported from many centres has been so materially reduced since the introduction of chemotherapy. However, we will see from time to time a patient with this infection who, in spite of the early institution of drug therapy, will run a rapid and fatal course.

SUMMARY

A series of 14 consecutive cases of acute meningococcic meningitis treated with sulfapyridine and soludagenan is reported. The first four cases also received meningococcus antiserum. There was one death, giving a mortality rate of 7 per cent.

The short clinical course, the possible absence of sequelæ, and the rapid changes in the spinal fluid as the result of chemotherapy are noted.

The dosage of the drug administered to these patients produced what has been called an effective drug level in the spinal fluid, and it was well maintained for four or five days, even with a daily lumbar puncture. The infection

was controlled, the spinal fluid returned to normal, and the child regained good health in a short period of time.

The possibility of the continuance of the signs of cerebral irritation after the first two or three days of treatment with sulfapyridine being due to a toxic reaction resulting from heavy dosage or to an individual sensitivity to the drug is discussed, also the danger if the treatment is not immediately discontinued.

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RÉSUMÉ

Quatorze enfants furent traités dont 4 reçurent le sérum et la sulfapyridine, et 10 la sulfapyridine et le soludagenan en injections intramusculaires. Avec la chimiothérapie la maladie passe habituellement à la phase de résolution dès le troisième jour. La seule mortalité signalée dans notre série fut observée chez un enfant dont le début de la maladie remontait à quelques jours avant son admission. Il semble que le meilleur mode de traitement soit l'administration de sulfapyridine par la bouche ou de soludagenan en injections intramusculaires diluées dans 2 à 3 fois leur volume d'eau distillée. La dose administrée chez nos malades fut de 1 gr. par lb. de poids par 24 heures. Le total est divisé en 6 doses égales. Les doses initiales doivent être doublées; vers le sixième jour, elles sont données à intervalles de 6 heures, puis cessées vers le 7ième ou 8ième jour. De cette façon, la concentration de sulfapyridine dans le l.c.r. est satisfaisante. Le taux de 4 à 6 mg. pour cent doit être maintenu 5 à 6 jours. Les P.L. quotidiennes permettent l'évaluation du taux de sulfapyridine, les examens bactériologiques et cytologiques. Le traitement par la sulfapyridine doit être institué dès que la maladie est soupçonnée. Les séquelles sont à peu près nulles. Parfois il y a intérêt à cesser la sulfapyridine si les signes méningés continuent lorsque le l.c.r. s'améliore aux points de vue cytologique et bactériologique; le dosage de la sulfapyridine est alors trop élevé.

JEAN SAUCIER

THE RELATION OF ARTERIOSCLEROSIS AND ARTERIAL HYPERTENSION TO MENTAL DISORDER*

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THE physiology and pathology of the blood circulation in the central nervous system occupies the interest of neurologists and psychiatrists more than ever; yet there exists in the literature still a good deal of discrepancy as regards the psychoses associated with arteriosclerosis (de Monchy,⁴ Rhein, Winkelman and Patten,⁶ Neuburger,⁵ Hiller,² Mayer-Gross,³ Clow¹). This is not surprising if one considers the fact that the various clinical and anatomical entities of arteriosclerosis or hypertension are

themselves still under dispute, and that the relation of these two conditions to one another is far from being clear.

Neuburger and Hiller both felt from a survey of numerous cases that further studies might enable us to separate a hypertensive type from a purely arteriosclerotic type of mental disorder. Consequently, Mayer-Gross came to the conclusion from careful clinical observation of patients treated at the Maudsley Hospital in London that the psychiatric aspects of "hypertensive" and "purely arteriosclerotic" cases

* From the Verdun Protestant Hospital.

show a distinct difference. Indeed, if one follows his description, from psychological observation the "arteriosclerotic" group could not be distinguished from what one commonly calls "senile" just in order to differentiate it from "arteriosclerotic". Details as regards the previous literature will be discussed below.

There are certain facts which make the question even more intricate. For instance, the presence of peripheral arteriosclerosis by no means always indicates the presence of cerebral arteriosclerosis. Neubuerger reported that in only about 10 per cent of his autopsy cases of cerebral arteriosclerosis (mainly in mental hospitals) did he find generalized arteriosclerosis. Moreover, it is well known that a considerable degree of arteriosclerosis as well

as arterial hypertension may occur without any mental impairment.

The following is a short survey of those cases in which the diagnosis of cerebral arteriosclerosis has been made at autopsy. Among a consecutive series of 53 autopsies at the Verdun Protestant Hospital cerebral arteriosclerosis was found in 12 cases. In 5 of these it was obvious that arteriosclerosis cerebri was in no way related to the patient's psychosis. Into this group belongs, for instance, a patient who had been admitted in 1909 at the age of 32 with symptoms pointing to dementia præcox and had finally in 1940 succumbed to a massive apoplectic hæmorrhage with rupture into the ventricle. In the remaining 7 cases the relations between circulatory disturbance and psy-

TABLE I.

Name Age Sex	Duration of disease. (Duration of stay in hospital)	Main clinical features	Blood pressure	Arterio- sclerosis Circle of Willis	Arterio- sclerosis of intra- cerebral arteries	Athero- matosis of aorta	Involvement of kidneys	Main cerebral lesions
Case 1 H.S.B. 52 M.	6 weeks (6 days)	Acutely disorientated, hallucinations, delusional, severe conduct disorder.	182/110	+++	++	*		Bilateral occipital infarction.
Case 2 E.S. 66 M.	4½ months (2 months)	Confusion with lack of memory and orientation, slight facial palsy (?) Final coma.	180/105	+	++	+	+	Multiple necrotic areas in thalamus and lenticular nucleus, bilateral.
Case 3 J.A. 54 F.	2 years (5 weeks)	"Unduly suspicious" for 2 years, acutely disorientated, hallucinated, delusional for 5 weeks.	275/190 140/100 192/122	+++	++	+	+	Infarction of left cerebellar hemisphere, diffuse cerebral degenerative changes, cortical and sub cortical.
Case 4 J.R. 70 M.	3 months (9 days)	Acute confusional state with emotional instability, irritability.	130/90	++	+++	++	+	Diffuse cortical degeneration.
Case 5 T.B. 62 M.	11 years (3 years)	Patient's father at this hospital for 2 years. Patient himself: "spells of melancholia" for 8 years. For 3 years impairment of memory and orientation, with long lucid intervals, Parkinsonian features.	148/90 190/120 192/84	+++	+++	++	+	Infarction of right insular region. Multiple small necrotic areas in basal ganglia.
Case 6 T.A. 67 M.	8 months (2 days)	Episodic confused states with hallucinations and delusions. Completely lucid intervals.		++	+++	++	+	Right temporo-occipital infarction, left cerebellar infarction, diffuse cortical changes.
Case 7 M.E. 65 F.	11 months (9 months)	Spells of dizziness with semi-consciousness, aphasia, slight right hemiplegia, delusions, conduct disorder. Psychosis clears up, whereas aphasia remains. Hirsutism, obesity.	240/150 250/150 180/130 230/130	+++	+++	+++	+++	Infarction of left insular and temporo-occipital region. Infarction of right and left cerebellar hemisphere. Basophile cell changes in pituitary.

(*In case 1, consent had been obtained for an autopsy examination of the brain only).

chosis was apparent. In order to avoid lengthy case histories, an attempt was made to tabulate the most essential features of each case in the following way.

We see that apart from two cases the duration of disease was surprisingly short, *i.e.*, less than one year. One of the two cases of longer duration is not a clear-cut case of circulatory psychosis. The patient had been known to a physician as having "spells of melancholia" for 8 years preceding those symptoms which pointed to an organic process. Moreover his father had also been a patient in this hospital. In the other case (3) a period of two years during which the patient was "unduly suspicious" had preceded the outbreak of an acute organic syndrome with dimming of consciousness, hallucinations and delusions. This lasted five weeks until death, and represented apparently a post-apoplectic psychosis, judging from the cerebellar infarction which histologically might well correspond to this length of time.

The situation is very similar in case 1, except for the fact that we know nothing about preceding personality changes, and in case 7. In the latter a gross sensory aphasia remained after the psychosis had cleared up, and it was this aphasia which kept the patient in hospital until she died in coma. The remaining ones presented the picture of a sub-acute organic psychosis with a marked tendency to fluctuation which is so pronounced that one can even speak of an "episodic" character of the disease. For instance, in case 6 we had the history of a man who for 8 months had suffered from spells of impaired memory with disorientation, delusions, hallucinations, and severe disorder of conduct. When he was sitting in the admitting doctor's office, he was perfectly rational, and his speech and behaviour seemed to contradict the statements in the commitment papers. He had a relapse the same day and died within 48 hours' stay in the hospital. A short time before his death his state of confusion had cleared up once more. In case 5, who had the longest period of duration of illness, there is a note in the records: "On two occasions I was unable to demonstrate any psychotic symptoms". In other words, the picture of gradual progressive deterioration, so characteristic of senile dementia, appears to be entirely absent from these cases, and if this element was present at all it was inconspicuous

as compared with the more dramatic episodic and acute disturbances.

It seems still more noteworthy that there is no case of pure arteriosclerosis unaccompanied by hypertension among this group, except perhaps for case 5. In case 4 there was a definite history of hypertension; however, when the patient was in hospital he showed severe signs of decompensation and his blood pressure was no longer raised, but he showed the typical left cardiac hypertrophy at post-mortem.

There is no indication clinically or anatomically that renal insufficiency and toxæmia played a part in any one of the cases, except perhaps in case 7. Convulsions or transient focal disorders, as we see them in "pseudo-uræmic" states did not occur in anyone.

A glance at the cerebral findings shows that in those cases in which a gross lesion was present, the psychosis appears not to depend on the site and nature of the lesions. Those psychoses which can be grouped as "post-apoplectic" were connected with cerebellar, occipital, and temporal lesions respectively.

DISCUSSION

Hiller distinguishes the following types of arteriosclerotic psychoses: (1) arteriosclerotic dementia; this is a gradually progressive deterioration similar to senile dementia; (2) post-apoplectic psychoses; these are acute delirious pictures following cerebral "stroke"; (3) episodic disturbances; (4) "accessory" psychoses. The latter are diseases simulating disturbances of the manic-depressive or schizophrenic group; in these cases a paranoid or manic or depressive predisposition which is latent becomes manifest obviously under the influence of circulatory disturbance. deMonehy also came to the conclusion that one has to distinguish between the organic syndrome produced by destruction of brain substance and other psychotic symptoms which were only precipitated by the vascular disease. In the majority of the latter he found indications of hereditary predisposition. Rhein, Winkelman and Patten⁶ distinguish in a clinico-anatomical study the following group: (1) Cases with gross softenings corresponding to an obstruction of large vessels. These patients suffer from a sudden onset of mental symptoms and show a marked tendency to deterioration. (2) Patients with arteriosclerosis of the small intracerebral vessels. These show a "progressive arteriosclerotic psychosis" characterized by

gradual deterioration. They are mentally the "second childhood" type. (3) There are cases which show a combination of these two forms. (4) Fibrosis of the small cerebral vessels in old age was found not to be associated with mental symptoms.

Mayer-Gross³ gave a survey of psychotic disturbances associated with arterial hypertension at a symposium of the British psychiatrists on "The Circulatory System and Mental Disorder". He limited himself to the clinical observations. The 7 cases of hypertension which he described were all characterized by severe episodic disturbances, twilight states, episodic emotional fluctuations. He came to the conclusion that "reparability of function brings the hypertensive cases into marked contrast with the arteriosclerotics". He described the "pure arteriosclerotics" as patients with a "slowly progressing deterioration of the personality with more or less marked focal symptoms. There are no twilight states and no lively fluctuations of mood in pure arteriosclerosis; the whole clinical picture is shallow and indistinct as compared with hypertensive illness. Decline of emotional response, failing of interest, intelligence and memory go parallel and are more or less definite." Clow found transient, more or less acute, psychotic pictures in the majority of his patients and "deteriorated behaviour" as an outstanding feature in 14 out of 100. This, too, is only a clinical report.

In the present group we cannot make such a distinction. Indeed we were unable to demonstrate any case of "pure arteriosclerosis". It remains still to be seen whether arteriosclerosis unaccompanied by arterial hypertension is able to produce mental disturbance, unless it causes apoplexy and post-apoplectic psychosis. One case in which possibly pure arteriosclerosis was present was a case of longstanding affective disorder and with a definite family history. Moreover, the picture of slowly progressive, shallow decline of the total personality was not observed in any of the present cases. They all presented more or less dramatic pictures of an acute or subacute course; definitely episodic disturbances were also present.

One is, of course, not allowed to draw definite conclusions from a comparatively small number of cases. If these findings, however, should be confirmed in a larger survey, one could say that those cases in which the psychosis is

definitely related to the arteriosclerosis, are cases of genuine hypertension. They can be clearly separated from hypertensive cases associated with acute or chronic glomerulonephritis on one hand, and from the "pure" or "senile" type of arteriosclerosis on the other. From the first they can be distinguished by the absence of pseudo-uræmic pictures (convulsions, transient focal symptoms) and from the latter by the absence of the slowly progressive irreversible deterioration of the personality.

It is well known that senile dementia and its anatomical equivalent are completely independent of the degree of cerebral arteriosclerosis. It is possible that a "pure" senile form of cerebral arteriosclerosis exists; it is then an accidental feature of pathological ageing of the central nervous system and has nothing to do with the cause of this process. In this case the "pure" form of arteriosclerosis referred to by the authors would probably belong to the anatomical and clinical picture of senile dementia.

SUMMARY

Among a consecutive series of 53 autopsies in a mental hospital cerebral arteriosclerosis was present in 12. In 7 it was related to the disease. Six of these patients had suffered from arterial hypertension; the single case of "pure" arteriosclerosis was, however, one in which endogenous personality changes based on a hereditary predisposition had preceded the organic disease. With this one exception, the pictures were those of acute or subacute disease of the organic type, post-apoplectic psychoses or episodic disturbances. It is attempted to delimit the clinical picture of encephalopathy in genuine hypertension from that in acute and chronic glomerulonephritis on one hand and "pure", senile arteriosclerosis on the other.

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RÉSUMÉ

Neurologues et psychiatres cherchent à isoler un type artérioscléreux et un type hypertensif de psychopathies. Sur 53 autopsies faites au V.P.H., l'artériosclérose fut trouvée dans 12 cas. Chez 5 d'entre eux il n'existait pas de relation entre l'artériosclérose et la psychose présentée. Chez les 7 autres, psychose et artériosclérose avaient des rapports apparents. Chez tous, —sauf 2, d'ailleurs moins typiques cliniquement,— la durée de la maladie fut courte: moins d'un an.

Chez les autres domine le caractère subaigu, épisodique de la psychose organique; la progressivité démentielle fait défaut. Presque tous s'accompagnaient d'hypertension artérielle. Les 4 classes de Hiller ou celles de Rhein, Winkelman et Patten rendent bien compte des inter-relations psycho-vasculaires. Tous les cas rapportés par Mayer-Gross ont trait à des psychoses épisodiques. Pour cet auteur, les artérioscléreux purs évoluent progressivement vers la démence. Cette conclusion ne concorde pas avec nos observations.

JEAN SAUCIER

PROBLEMS OF ARMY HYGIENE*

BY MAJOR M. R. ELLIOTT, R.C.A.M.C.

WE are told that some 14,000 of the young men who have been enlisted in the Canadian Army during the past months' concerted effort, are required solely to replace that number who have been discharged since 1939. Surely nothing could emphasize with such impelling force that the health of military commands is one of the first matters to be considered in the development of military forces. That this principle, which has been acknowledged for years by all army leaders, continues to be of first importance in active military operations, cannot be overstated.

The medical profession has, at times, accused those of us who were engaged in public health work in civil life, of perhaps being too enthusiastic in our zeal for measures of hygiene or preventive medicine. But in the army, there can be no mistake of the priority of our responsibility in this regard. One is struck by the repeated emphasis in all our regulations and orders, that the first duty of a medical officer is the care and protection of the health of his men. The care of the sick or wounded, however important, is secondary. The object of army hygiene is military efficiency in its broadest sense, and it must therefore assume an ever increasing importance. It must be wide enough in scope to include anything and everything that will maintain, improve or affect the soldier's fitness for active service, and thereby his military efficiency.

From the standpoint of pure science, the principles of hygiene are universal and well understood, and the result of their application in civil communities constitutes one of the great achievements of the past 50 years. But in the

army, these principles must be adjusted to meet the practical application necessary to changing military environment, which, after all, must shape all our policies. Army hygiene must first recognize the character of a military population, and as this is determined by our method of selection by examining boards, this physical examination of the recruit becomes in itself a phase of military preventive medicine, as do likewise all subsequent examinations, whether performed for eliminating the unfit, or to detect incipient defects. By our present standards, and assuming that our examinations have reached that stage of perfection towards which our medical boards are striving, we are dealing in the army with a highly selected portion of the general population. As distinct from a civilian population it should present, on the surface, a minimum of health problems. And yet, our general staff acknowledge that disease or sickness is one of the deadliest enemies attending the early concentration of men.

Why is this? Well, several factors must be considered.

Firstly, young men from civil life, brought together in large numbers from every part of the country, bring with them diseases prevalent in various sections. By modern transportation methods today they can be brought from their homes to any camp in the country within the incubation period of many communicable diseases, and will inevitably bring with them, early and missed cases.

Secondly, military activities are accomplished, not by individuals but by masses of individuals organized into units. The members of a unit are fed and housed as a group, drilled and trained as a group, and there is therefore much closer contact than in civil life, with corresponding opportunities for spread of infection.

* Read at the Seventy-Second Annual Meeting of the Canadian Medical Association, Winnipeg, June 26, 1941.

Thirdly, owing to the increasing degree of protection from disease afforded children today, greater numbers are reaching adult life without contact at home, and thus reach camp with a low resistance to the common infectious diseases, that is to say, new units today have a higher group susceptibility.

Fourthly, when troops are away from established stations, they are necessarily subjected to more primitive environmental conditions; water must be obtained from any source; food must be prepared and served under temporary conditions; shelter must be improvised and wastes must be disposed of wherever produced.

Lastly, military camps are an inherent part of the civilian community surrounding, and diseases endemic to the locality, will, unless prevented, tend to spread amongst the troops.

To affect these obvious disadvantages, however, are other factors which weight the scales very favourably on the side of health protection. The very fact that soldiers must of necessity lead a disciplined and communal life, which is under constant supervision, all allows for the adaption of any sound health measures, much more freely and effectively than in a civilian community. We need mention only a few examples, of which there are many. The incidence of disease transmitted by food has been reduced to negligible proportions. Small pox, tetanus, etc., are prevented by artificial immunization. Insect borne diseases can be practically eliminated by the application of known control measures. Chemical prophylaxis and education afford methods of controlling venereal disease.

Any member of a military organization may be physically examined at any time, and all the known benefits pertaining to periodic examinations are thereby procured.

As time goes on, and as the physical condition of the recruit is improved, and as full protective measures are used (though sometimes at the cost of mild epidemics) the group susceptibility becomes a group immunity.

As a result of these factors most diseases actually tend to be less than in a civilian population, and in fact, the only diseases which are more prevalent in the army are certain of the respiratory infections against which we have no adequate or specific control measures. But here I would emphasize the importance of the so-called minor diseases to the army. As has been said, the principal purpose of disease control in the army is to keep as many men as possible

physically fit for duty. Thus the importance of any disease and the value of control procedures are determined, not by their affect on morbidity or mortality tables, but by their influence on the non-effective fighting rate. For example, measles, mumps, diarrhoea and mild respiratory infections are normally of greater importance in the army, than more fatal diseases such as meningitis, etc., because they tend, if uncontrolled, to interfere to a greater extent, with training or combat activities. Neither must we forget the often overlooked and so-called "dirt diseases" of civil life such as boils, scabies and "athlete's foot", which may assume great importance by seriously reducing the fighting strength of a unit.

But army hygiene is not concerned solely with the control of communicable diseases. In the practical application of the principles of hygiene, by which we mean sanitation, we must be guided by two factors, namely military exigencies, and the possible limit of co-operation by other branches of the service. One needs scarcely remind such a meeting as this that the medical corps functions solely in an advisory capacity, and that the commanding officer of any unit, regardless of strength or type is responsible in all respects for that unit, including the health of his command. True that certain measures such as immunization or physical examinations are executed by the members of the Medical Corps, but only because these procedures require technical training, and they are carried out by direction of higher authority. In all other matters of hygiene and sanitation, the medical officer is responsible only for initiating and making investigations, studies, surveys and recommendations which in turn do constitute a basis for health measures by higher authorities. The execution of most health measures is by the branch of the army which normally performs the activity required; be it Engineers, Ordnance, or Supply. Thus, for maximum efficiency, the efforts of all branches must be co-ordinated to an ever increasing degree.

Let us consider briefly a few of the details surrounding a soldier's life which come within the scope of hygiene, and to which the medical officer must give his attention in an advisory or supervisory capacity.

CLOTHING

If the clothing is ill fitting, or not suited to the climate, the medical officer will soon find his

sick parade increased by cases of skin chafing, blistered feet, heat strokes or respiratory infections. Hence definite supervision is necessary and close co-operation with the Quartermaster is very desirable. Of particular importance is the care of the feet, and a watchful medical eye should be kept on the fitting or alteration of boots, the frequent company foot inspections and the training of orderlies to assist. The provision of facilities to guard against fungus foot infections is a detail of no small importance, and all foot bath treatment should be under direct control of the medical officer.

Insufficient stress is sometimes given to details of personal hygiene, over which we must accept the responsibility for teaching. To insure freedom from skin infections and vermin, our inspections should include the cleanliness of under-clothing and the provision for adequate bathing and laundry facilities. A closely related hygiene problem in all districts is the provision for adequate facilities for the disinfection and disinfestation of clothing. Also, in co-operation with the dental officer, it is our duty to stress the importance of oral hygiene, and particular care is necessary in teaching personal hygiene to food handlers.

HOUSING OF TROOPS

While this is largely the concern of Engineers or Ordnance, the Medical Corps is responsible for the sanitary inspection and supervision of all buildings used for military purposes. We must make recommendations for correcting inadequate conditions of heating, ventilation, lighting, plumbing, or space accommodation, which would be inimical to health. To intelligently carry out this duty, the medical officer must be conversant with all minimum demands in accordance with proper hygiene, that is: what space is necessary? What constitutes adequate ventilation? How much ablution or latrine accommodation is required under varying conditions. He must be able to evaluate properly existing conditions to make comprehensive reports.

WATER SUPPLY

While the procurement of water is not a medical responsibility, yet it is an important part of army hygiene to make surveys, inspections and examinations of water supplies, and such recommendations as may be necessary to protect the health of the troops. Our problems here may be many and varied and we must be able to

evaluate sources of supply, the possibilities of pollution, the methods used for purification and disposal. This problem of water supply is of the first magnitude in almost every district in Canada. Here in Military District No. 10, for example, water for our various camps comes from lakes, rivers, creeks, deep wells and shallow wells, each with its own difficulties. Bacterial and chemical analysis, necessary for filtration and chlorination, etc., are all hygiene problems which differ in each locality, and with which the medical officer must familiarize himself.

FOOD SUPPLY

From the time food is purchased until it appears on the mess table, it is never without supervision by the Medical Corps. The details of this supervision are perhaps too numerous and too well known to mention. Suffice it to say that it includes the presence of a medical officer on all ration boards, the approval and supervision of all diet sheets, advice on methods of handling, transporting and storing of food, and the supervision in an advisory capacity of kitchen routine and messing insofar as these matters affect health. Kitchen sanitation and sterilizing of dishes are always pressing problems and call for constant watchfulness. Slipshod methods in the kitchen are no longer tolerated. Even the sources of food supplies such as bakeries, creameries, packing-plants and bottling works must be inspected to insure conformity with hygiene regulations.

CONSERVANCY

The army defines this as the collection, removal and disposal of all wastes. It is of necessity of paramount practical importance, so much so that many still, whether in ignorance or facetiousness, consider the term hygiene synonymous with sewers and latrines. In reality, conservancy is but a small part of sanitation, though its neglect brings a train of evil circumstances more quickly than any other branch. The wastes which are factors in the spread of disease are human excreta, garbage and liquid waste from kitchens and ablution rooms. The scope of sanitary control exercised by the Medical Corps must therefore include such details as proper construction, size and type of latrines to conform with existing conditions. The medical officer must be able to advise on the adoption of measures best suited to the locale, for the disposal of excreta, whether it be by sewage,

septic tanks, burial or incineration. He is the responsible adviser on the collection, retention, and disposal of garbage so as to obviate any nuisance or fly hazards. He must see that provision is made for the incineration of all combustible refuse in suitable and adequate incinerators, and that the sanitation of disposal areas is up to requirements. He must in addition be prepared to make sanitary surveys of sites or plans for proposed waste disposal facilities of a permanent nature, as well as to advise in the adoption of emergency means in the field.

If, by now, you have conceived the impression that the problems of army hygiene demands of a medical officer the combination in some mysterious way of the attributes of an epidemiologist, a quartermaster, an engineer, a plumber, a building inspector, and a sanitary inspector, along with the scientific knowledge of a physician and surgeon, then perhaps it is not necessary to discuss all the matters still left untouched.

One need only read the records of former wars to realize just what vast strides have been made in the protection of the health of our troops. The figures are doubtless familiar to you. But we are a long way yet from our ultimate goal. Many problems still remain, and in closing I would leave with you just a few of these remaining problems in army hygiene which must occupy our thoughts now and in the future, if we are to make continued and necessary progress.

First I would put *mental hygiene*. Surely no phase of hygiene has been more neglected in the past. True, it is now beginning to receive something of a due consideration, but when we realize that 2 out of 5 veterans receive pensions because of neuro-psychiatric disabilities, and that 3 out of 7 men discharged from the American army as recently as 1939 were suffering from mental diseases, the enormity of the problem is evident. In all our own units the sick parade and detention barracks are crowded with indi-

viduals who are definitely suffering from some neurologic or psychiatric condition. Efforts must be made to evolve methods for eliminating these unfit at the recruiting stations if possible, or at least before their demoralizing effect on other men has been felt.

In the control of *communicable diseases* much has been accomplished, and as much still remains. Means must be found to materially reduce the large numbers of our forces who are constantly non-effective in a military sense because of upper respiratory infection, or other so-called mild epidemics. Perhaps the problem of space accommodation or provision for isolation and quarantine is in need of further consideration. Perhaps we are not making full use of our wonderful opportunities in the army for scientific research for preventative measures. But apart from these conditions, we are still losing too much man power due to infection over which we have known control, such as trench mouth, scabies, "athlete's foot", etc. Even in this modern army venereal disease control is still inadequate. Granted that it is much less prevalent than in former wars, but in the light of modern knowledge, why should we have wards in every hospital full, or even half full of these entirely preventable diseases? In what details are we falling down here, and does not the fault lie largely with ourselves? Our need for man power today is too great to allow of this waste and I do not feel that we as a Corps, are discharging our full responsibility with respect to education of the troops in this respect. The mechanics of hygiene, excellent though they are today, are effective only insofar as the human element is made to keep pace with them.

It was Jean Rousseau, in the 18th century, not a hygiene officer, who said, "Hygiene is the most important part of Medicine, and Hygiene is rather a virtue than a science". If there is any truth in that, and I leave you to be the judge, may I bespeak for all medical officers, great virtue.

PROPHETIC POETRY.—Several English poets of long ago, among them Cowper and Tennyson, have written verse prophetic of fleets in the air. We owe to Premier Mackenzie King that we are able to add one more to the list. Mr. King, in a stirring address given recently at Mansion House, placed Thomas Gray also among the seers. The original very remarkable lines were written in Latin about two hundred years ago by the author of the "Elegy in a Country Churchyard". The following is said to be an excellent translation.

The time will come, when thou shalt lift thine eyes
To watch a long-drawn battle in the skies,
While aged peasants, too amazed for words,
Stare at the flying fleets of wond'rous birds.
England, so long the mistress of the sea,
Where winds and waves confess her sovereignty,
Her ancient triumphs yet on high shall bear,
And reign, the sovereign of the conquered air.

THE MANAGEMENT OF CARCINOMA OF THE CERVIX UTERI*

BY BERNARD R. MOONEY

Winnipeg

THE management of carcinoma of the cervix can be conveniently considered under three headings: (1) diagnosis; (2) treatment; (3) follow-up. Observations on the first two are based on a group of 115 patients treated at the Winnipeg General Hospital in the three-year period from November 10, 1937, to November 10, 1940. It is felt that no remarks worth while could be made at this time regarding the follow-up of these cases.

The x-radiation used in all cases was produced by a 400 kv. machine. Daily records were kept of the dosage, and the condition of the patient while undergoing treatment. Progress notes include weekly complete blood counts, cell volume, icterus index, and sedimentation rate, and frequent pelvic examinations.

It is reasonable, I believe, to state that in the Province of Manitoba under the Cancer Relief and Research Institute the facilities for treating cancer are adequate so far as radium is concerned, but x-ray equipment according to a study of present conditions would have to be doubled at least. The registered death rate from cancer is gradually climbing until in 1939 it stood second in the five leading causes of death. Fig. 4 illustrates this point. This gradual increase in the registered death rate from cancer in general applies to cancer of the cervix as well.

DIAGNOSIS

Unfortunately in the great majority of cases the disease is in an advanced stage when the patient is first seen by the doctor, and there is very little difficulty in arriving at a clinical diagnosis. Biopsy is always advised both for histological grading and for accurate diagnosis. Clinical stages and pathological grades are as follows:

Clinical Stage I.—Primary lesion limited to the cervix.

Clinical Stage II.—Primary lesion in cervix with moderate extension into parametrium or vaginal wall. Uterus freely movable.

Clinical Stage III.—Primary lesion extending well into parametrium with fixation of the uterus.

Clinical Stage IV.—Advanced disease with fixation of the uterus or distant metastasis.

The pathologist classifies the neoplasm into Grades I, II, and III according to the histological picture.²

Grade I.—Adult type made up of highly differentiated cells with tendency to cornification and formation of pearls. Radio-resistant.

Grade II.—A plexiform type in which the cells have lost most of their squamous character, show a plexiform arrangement, a tendency to infiltration, and a moderate degree of anaplasia. More radiosensitive.

Grade III.—The anaplastic type in which the cells have lost all squamous character are completely undifferentiated and diffusely invasive. Highly radiosensitive.

Fig. 1 shows graphically the percentage of patients grouped in clinical stages I, II, III and IV; and Fig. 2, the microscopic grading into grades 1, 2 and 3.

There seems to be some difference of opinion regarding the response of the different histological grades to radiation.¹¹ It is true that surgical results may be better in grade 1 and worse in grades 2 and 3, but experience has established that this is not true of radiation treatment. Some authorities produce evidence that grades 1, 2, and 3 give about the same five-year survival rate when radiologically treated.¹ We feel, however, that in the plan of treatment the clinical stage of the disease deserves more attention than the histological grade.¹⁵

Early diagnosis always needs to be stressed. Whatever may be the etiological factors in carcinoma of the cervix there is no doubt that abnormal vaginal bleeding is by far the most common and earliest warning. The slightest amount of this bleeding, or blood-tinged discharge, should excite suspicion and call for immediate and careful investigation, including biopsy if the cervix presents a doubtful area. Abnormal discharge from the vagina is also worthy of the closest scrutiny.

Just how much delay in diagnosis is due to the patient's ignorance of the early symptoms and how much to lack of financial means to pay for the treatment is difficult to estimate,

* Read at the Seventy-second Annual Meeting of the Canadian Medical Association, Section of Radiology, Winnipeg, June 26, 1941.

but it is surprising and depressing to hear so often, this statement: "The reason I did not go to the doctor sooner was because I was afraid of the expense of the treatment".⁹

TREATMENT

In planning the treatment of carcinoma of the cervix there are a few important principles to consider. The amount and filtration of the radium used and the dosage and time required for the x-ray series must be planned for each patient. The general physical condition of the patient, including the age, is important. A patient debilitated by hæmorrhage and infection, should be restored by transfusions and medical measures to a condition in which she will stand x-ray and radium treatment; otherwise, the radiation itself may do more harm than good. Elderly women with degenerative disease and the young have a poor prognosis. Fig. 3 illustrates the number in each age group. The plan of procedure will also depend on the following conditions in about the order named: (a) the clinical stage of the growth; (b) whether or not pyogenic infection is present; (c) the histological grade; (d) whether or not the lesion is fungating or is of the ulcerating or evacuating type. Unfortunately also, we have to consider the patient's economic status, that is, how long can she afford to live away from home. Repeated inadequate treatments with radiation, x-ray or radium should be avoided if at all possible. The first attack is the important one. Radiation tinkering is quite as dangerous and unsuccessful as surgical tinkering.¹²

We must first endeavour to prevent the spread of the carcinoma by metastasis and local invasion, and every means at our command should be made subservient to that aim. Patients do not die of the local lesion as a rule, but they do die from extension of it, permeation of vital structures, and from distant metastasis. Next to the cancer itself, the unsuccessful treatment of carcinoma of the cervix is due to infection, and the leader in this group is sepsis of the urinary tract.

Our plan of action then, is to restore the patient to a good physical condition if indicated, control pyogenic infection if possible, and attempt to prevent extension of the local disease by metastasis and local permeation. The time required for the total treatment need not be extended, because x-radiation can safely

be given at the same time as the above local and general measures are going on.¹³ A large fungating infected vaginal mass, in which it is difficult or impossible to locate the cervical canal, can be destroyed by x-radiation and the subsequent insertion of radium converted into a simple procedure.

MANAGEMENT ACCORDING TO THE CLINICAL STAGE

Clinical Stage I.—Primary lesion confined to the cervix. Three methods of treatment are at present indicated: (a) radium; (b) x-radiation; (c) surgery.

Radium only is perhaps the most commonly used, and, theoretically, should be all that is necessary if one is sure that the disease is confined to the cervix. In practice, however, when there is any doubt it is often considered safer to advise a complete course of x-radiation.

X-radiation only, using an intra-vaginal cone placed in contact with the lesion, is now used in some centres where proper equipment and personnel are at hand. I have had no experience with this method but, according to the literature, it is scientifically correct and has some advantages.^{8, 10}

Surgical operation. In the three-year period mentioned above the records of the Winnipeg General Hospital show that four cases were treated by operation. In each case the malignant lesion was apparently not the primary reason for the operation, because a Stürmdorf operation was done on two occasions and an amputation on the other two.

Clinical Stage II.—Primary lesion in the cervix with moderate extension to the parametrium or vaginal well; uterus freely movable.

In this stage it is now generally agreed that radium alone cannot be depended on to control the disease and x-radiation is added either before, during, or after the application of radium.¹⁴ Fig. 5 is a summary of the distribution in this series of patients. Many authorities^{3, 4, 5, 7} think that the complete x-ray course should be given first in order to destroy or devitalize cancer cells, minimize the local process, and reduce the danger of metastasis. This, in the light of the known local action of radium, seems a sound procedure. Another advantage is that infection, which very commonly complicates the picture, can be cleared up during the x-ray treatment and before radium is inserted. The intense local action of the radium, where the

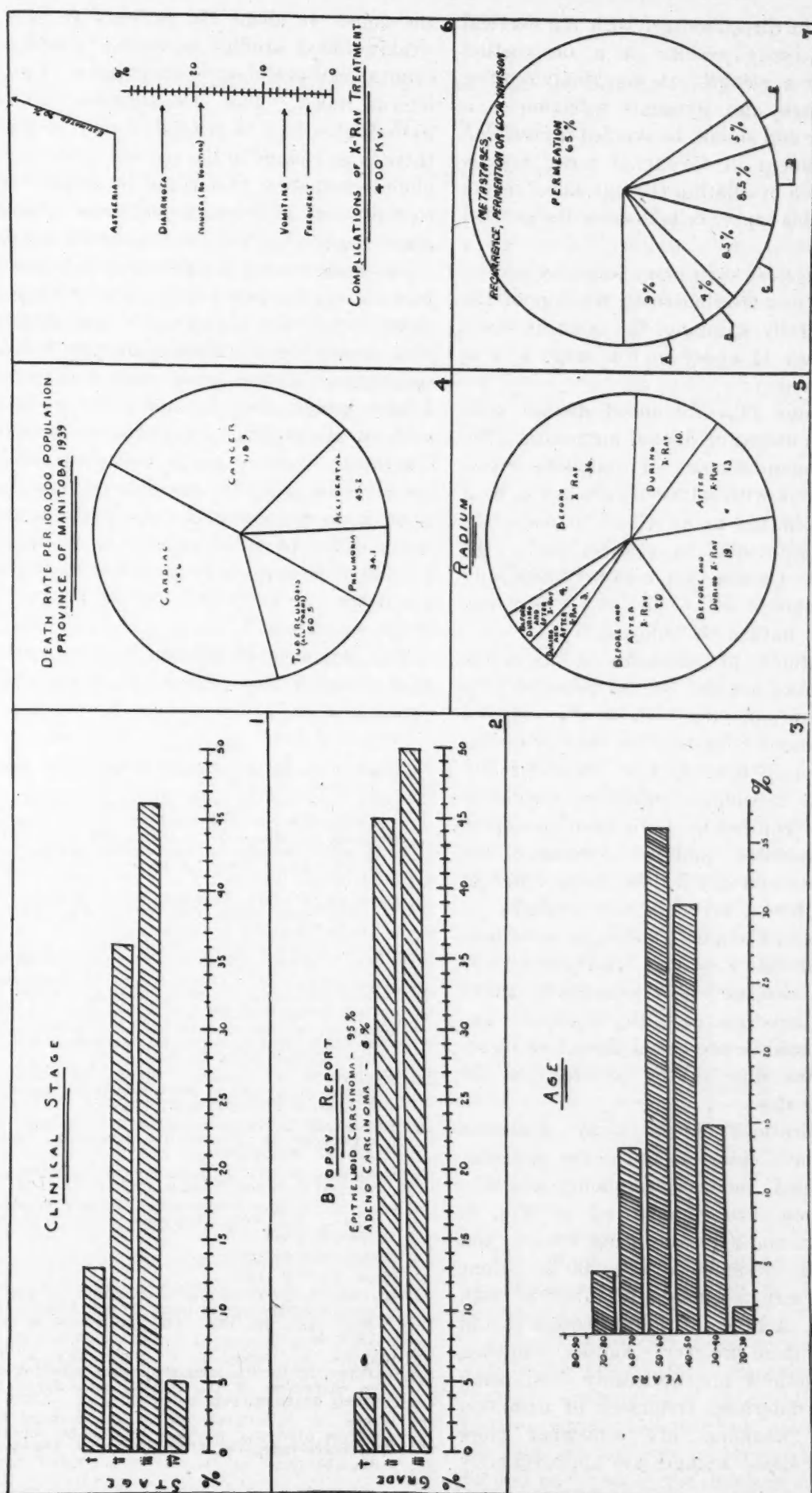


Fig. 5.—Briefly the plan of x-radiation treatment was as follows: 400 kv., 5 ma., 7 mm. copper filter, 55 cm. distance, 6 areas, size of each area 15 x 15 cm., 300 r. a day, 40 to 50 treatment days; total dose—12,000 to 15,000 r. (The radium applicator commonly used is made of two 50 mg. tubes in tandem—sometimes 10 mg. tube in each fornix. The filter is 1 mm. platinum, 1 mm. brass and rubber tubing. The total dosage is between 5,000 and 6,000 milligram hours, given usually in two applications). Fig. 7.

—(A) Metastases; (B) recurrence and metastases; (C) recurrence; (D) permeation and metastases; (E) permeation and recurrence.

applicator is in direct contact with the cervical canal, of necessity results in a destruction amounting to a slough. A combination of a radiation slough and pyogenic infection is a serious matter and should be avoided if possible.⁶ Another argument in favour of x-ray first is that the trauma of dilating the untreated cervix may allow viable cancer cells to enter the general circulation.

Clinical Stage III.—Primary lesion extending well into the parametrium with fixation of the uterus. Generally speaking, the remarks made regarding Stage II apply in this stage and to a greater degree.

Clinical Stage IV.—Advanced disease with fixation of the uterus or distant metastasis. The maximum accomplishment of radiation treatment in patients with advanced disease is, as a rule, only palliation in an effort to make the patient as comfortable as possible under the circumstances. Occasionally a rather surprising temporary response will occur, and a few five-year survivals have been reported.

In the treatment of carcinoma of the cervix uteri x-radiation has not so far taken a very prominent position except in a few centres. Some of the reasons for this are easy to understand. It is only recently that trained radiation therapists in sufficient numbers, and satisfactory x-ray equipment have been available. Radiation physicists, qualified to measure the output of tubes and depth dose, using different voltages and filters, are only now available in many sections of Canada. Now it is more generally realized that a patient receiving a large dose of x-radiation, such as is necessary in cancer of the cervix, has to be carefully watched. The radiologist should be present at these treatments and adjust the dose to the patient, not the patient to the dose.

The complications of the x-ray treatment itself, as I have observed them, are asthenia, diarrhoea, nausea, vomiting, frequency and skin changes. These are summarized in Fig. 6. Some are more marked when using 400 kv., and others are more pronounced with 200 kv. None of them are serious enough to interfere with the treatment. A little tact and attention should be devoted to them however. Nausea, vomiting, and skin reactions are noticeably less, using 400 kv., but diarrhoea, frequency of urination and general weakness are somewhat more troublesome. Blood changes are approximately

the same. In about 150 patients we have done weekly blood studies including complete cell counts, cell volume, sedimentation rate, and icterus index. This investigation will be reported later, but, in general, it may be said that there is no change in the red cell count or hæmoglobin estimation that could be considered due to radiation. The neutrophile and lymphocyte count shows an initial drop, a subsequent fluctuation, and returns to normal after treatment. In treating the pelvis with super voltage diarrhoea is the rule; if radium is used during the x-ray series the diarrhoea is increased and may occasionally become troublesome and prolonged. I have seldom found it necessary to interfere with or discontinue treatment on account of diarrhoea. Quite often it clears up while the course is in progress, and I have come to look upon it as a good indication that the dose is being delivered in the depth as it should be. I think it is much safer and less distressing to the patient if x-ray and radium are not given at the same time.¹⁶

The incidence of metastasis, recurrence, and local invasion from the initial lesion are compared in Fig. 7.

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A REVIEW OF THORACOPLASTIES IN SASKATCHEWAN*

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THE analysis of the end-results of tuberculosis treatment has been of great aid in measuring the efficiency of the various therapeutic measures. Thoracoplasty has had to bear its share of critical examination. That it has prolonged life in a group of patients with extensive disease and cavitation is evident from all follow-up studies. However, the late mortality, the number who have resumed employment, and the proportion of non-infectious and infectious cases will eventually determine its maximum contribution to treatment. These end-factors have been carefully studied in our own group of patients and are being presented along with other pertinent data.

Our Provincial program of thoracic surgery was begun in 1927. Naturally, throughout subsequent years this program gradually has been expanded as our experience widened. We have gone through our periods of "trial and error". No very original work was possible and the free application of the experience of others in the field is frankly admitted, also with due appreciation.

From 1927 to the end of 1940 thoracoplasties have been done on 312 patients, representing a total of 898 stages, not including re-operations. However, since tuberculosis is a chronic disease it was felt that the results of treatment should be assessed in years rather than in months. Therefore, this paper constitutes a record of only those patients whose original chest surgery was completed by the end of 1938. In other words, with every patient at least two years has elapsed since the original thoracoplasty was finished. During the period 1927 to 1938 inclusive 229 patients were in this category, and on these 625 operations were performed. About 95 per cent of the operations were done under nitrous oxide anaesthesia combined with local infiltration. The remainder were done under local anaesthesia only. The earlier operations were staged from below upwards, but since 1931 the procedure was reversed. Apicolysis has not been used. All the operations were performed

at the Saskatoon Sanatorium. There were 106 males and 123 females. Ninety-one patients had operations on the right side and 138 on the left. The age of the patients is shown in Table I.

TABLE I.
AGE AND SEX

Years	Male	Female	Total
17-19	1	4	5
20-29	30	62	92
30-39	46	35	81
40-49	23	22	45
50-54	6	0	6
	106	123	229

Operations on right side 91
Operations on left side 138

It is interesting to note (Table II) that in the years 1927 to 1933 inclusive only 34 patients had completed thoracoplasties. This is roughly 15 per cent of the total studied. There were 70 operations on these 34 patients, an average of two stages per patient. After 1933 there was a considerable increase in the amount of surgery done, and, following the general trend, more stages per patient were done and greater lengths of upper ribs were removed. In 1938, which was taken as typical of our more recent technique, it was found that there was an average of 3.45 stages per patient, in spite of there being some smaller lesions to deal with.

TABLE II.
COMPLETED OPERATIONS

Year	Patients	Operations
1927-1933	34	70
1934	26	70
1935	44	104
1936	40	132
1937	50	137
1938	35	112

The actual number of stages per patient in the whole series is set out in Table III (re-operations not included).

Phrenic nerve operations were not performed until a few years after thoracoplasties had been begun. Consequently, information regarding phrenic nerve procedure was available for only the last 165 patients in this series. Of these, 63 had paralysis of the diaphragm before thora-

* Read at the forty-first annual meeting of the Canadian Tuberculosis Association, Toronto, June 6 and 7, 1941.

TABLE III.
OPERATIONS PER PATIENT

No. of operations	No. of patients
1	21
2	87
3	75
4	35
5	6
6	3
7	2

coplasty; thirty-nine had avulsion of the nerve, and 24 had crushing. Since the time interval between the phrenic operation and the thoracoplasty varied from a very few weeks to many months, it was not possible to evaluate the results of the lesser procedure in any statistical way. An impression was formed, however, that slightly less than half of the 63 patients had shown clinical and symptomatic improvement.

INDICATIONS FOR OPERATION

In the majority of patients, the principal indications for major surgery have been pulmonary cavitation and bacillary sputum. In our series the existence of actively progressive disease, empyema, and pulmonary hæmorrhage were noted much less frequently. And, of course, two or more indications sometimes were present in the same patient. In the entire series of 229 patients only 9 had negative sputum before thoracoplasty—5 who were bacillary originally, and 4 others with closed tuberculous empyema.

CONTRAINDICATIONS

One would hesitate to set down hard and fast contraindications to thoracoplasty. With changes in technique, the use of accessory measures, and the publishing of reliable statistical and experimental information, the field of chest surgery has been steadily extending. However, we believe that the presence of extensive tracheo-bronchial lesions, recent or progressive disease in the opposite lung, and myocardial degeneration still are well-nigh absolute contraindications. In our ignorance in the past we have operated on some patients with gross tracheo-bronchial lesions and have regretted it later. Dyspnoea and low vital capacity are relative contraindications. Several of our early post-operative deaths were in patients whose pre-operative vital capacity was under 45 per cent.

SELECTION AND PREPARATION OF PATIENTS

Chronicity.—With the passing of years it has been recognized increasingly that prolonged

waiting for the disease to become chronic and "safe for surgery" has brought little but harm to the patient. In more recent years not many really "chronic" patients seem to be coming up for thoracoplasty and the period of sanatorium treatment prior to surgery has been much shorter. However, it is advisable that there shall have been no recent exacerbation of disease.

Contra-lateral lung.—We have tended to be less concerned about smaller lesions in the better lung, though we still feel that these should have been stable or retrogressive for six months prior to operation. This is not an inflexible rule, but provides a satisfactory working basis.

Cardiac reserve.—This should be adequate. In practice we have found that information obtained from observation of the patient on the ward, on exercise, and in bed, with the addition of simple exercise tests, cardiac auscultation, and blood pressure recording, has been sufficiently reliable. More elaborate investigations have been discarded.

Vital capacity.—This is measured. It is quite true that one can bring a patient through surgery successfully with a rather low vital capacity. However, in some of these patients the eventual margin of comfort and safety is so narrow that life becomes a burden. Borderline cases require careful sizing up prior to operation, and this should include a survey of the probable post-operative habits and needs of the patient. The estimation of the respiratory function of each lung promises to be a valuable aid in deciding about some risks.

Age.—In our series, youthfulness of patients has not entered the picture. Two of our patients were 17 years old. Again, our records suggest that on the whole patients 45 to 54 years of age are as good risks as the younger groups.

Pneumothorax.—It still is considered advisable that pneumothorax shall have been tried. A few weeks to a few months will prove whether or not the collapse is efficient. Further, the pre-operative aspiration of residual pleural fluids is a necessity. The need for following post-pneumothorax bacillary fluids is stressed because of the possible occurrence of broncho-pleural fistula and renal and other non-pulmonary complications. In our experience the re-expansion of a collapsed lung sometimes

has been hastened by lavage of the pleural space with oxygen.

Exercise.—A moderate amount of exercise before the thoracoplasty is desirable as the cardio-vascular tone, the vital capacity, the appetite, and the patient's frame of mind, generally, are improved.

Pre-operative complications.—The relative frequency of complications is shown in Table IV. In some instances as many as three or four might have been present in one patient. Usually, laryngitis or enteritis were not very active at the time of operation. The total of 17 empyemata includes two cases of mixed infection. It is probable that in the earlier years covered by this study some tracheo-bronchial lesions went unrecognized.

TABLE IV.
PRE OPERATIVE COMPLICATIONS

Tuberculous:	
Laryngitis	33
Enteritis	18
Empyema	17
Tracheo-bronchitis	7
Atelectasis	8
Broncho-pleural fistula	5
Active contra. lesion	7
Pneumo., residual	3
Pneumo., opposite	3
Non-pulmonary	17
Non-tuberculous:	
Chronic nephritis	4
Bronchiectasis	2
Amyloid disease	2
Miscellaneous	22

MORTALITY

Of the 229 patients whose surgery was completed by the end of 1938, 41 have died, thus giving a total mortality rate of 17.9 per cent. In other words, of the patients who had thoracoplasties as long ago as 1927 and 1928, 82.1 per cent are still living (Table Va).

In 14 cases death was attributed to the operation (so-called "early deaths") (Table Vb). The case mortality rate, therefore, was 6.1 per cent. Twelve of the 14 deaths occurred 18 days or less after operation. The others were 52 and 63 days respectively. As noted also in Table Vb, besides the 14 operative deaths there were 27 late deaths, the late mortality rate being 11.8 per cent. Twenty of these were due to tuberculosis. The total mortality directly and indirectly from tuberculosis, therefore, was 34, or 14.4 per cent. To those who recall the high mortality among advanced cavity cases which obtained prior to the use of

thoracoplasty these results are, to say the least, very encouraging.

The causes of post-operative death are tabulated below (Table Vc).

TABLE V.
MORTALITY

	No.	Percentage
(a) Total patients	229	
Total dead	41	= 17.9
Total living	188	
(b) Early deaths	14	6.1
Late deaths, tuberculous ...	20	
Late deaths, non-tuberculous. 7	27	11.8
Total deaths, tuberculous	34	14.4
(c) Early post-operative deaths:		
Cardio-respiratory decompensation	6	
Toxæmia	3	
Post-operative shock	2	
Tracheo-bronchial stenosis	1	
Acute tuberculous pneumonia	1	
Anoxæmia and low blood pressure	1	
Total	14	

POST-OPERATIVE COMPLICATIONS—
625 OPERATIONS

Wound infection occurred 65 times, or in 10.4 per cent of the operations done. This rate is admittedly high, but includes a series of infections which finally were attributed to a faulty sterilizer. The infection rate has markedly decreased in recent years. Of the infections 42 were superficial, 9 were deep, and in 14 the type was not specified. Those associated with tube drainage for empyema were not included.

Spread of disease occurred in the same lung 10 times, and in the contra-lateral lung 12 times. Tuberculous otitis media occurred in 8 patients. This incidence was more frequent than has been seen among sanatorium patients generally. We have been unable to account satisfactorily for this complication, though, naturally, suspecting coughing during general anæsthesia. Other complications were few and each numerically small.

Length of post-operative treatment in sanatorium.—Of those patients not requiring re-operation, 150, or 86 per cent were discharged within a year. Only 8 patients required treatment longer than 18 months. The type of results, number of spreads of disease, or number of readmissions that occurred in relation to those discharged very early were not studied separately.

Sputum.—The closing of chronic spreaders is a maximum contribution in any tuberculosis preventive program. The extent of conversion of bacillary sputum is, therefore, the best index of the value of thoracoplasty in such a program. The repeated examination of antiformin specimens has been accepted by us as a reasonable standard for ascertaining infectiousness.

Of the 188 living patients 179 were bacillary before thoracoplasty. Adequate information regarding sputum is available in 174, and we find (Table VI) that 135, or 77.6 per cent, of these patients are non-bacillary. Considering that so many had advanced disease with cavitation and some had serious complications we feel that the results have been well worth while. And when the total group we have worked with is considered it is found that 59 per cent are non-bacillary.

TABLE VI.
SPUTUM CONVERSION

	Total patients	Living patients
Number of patients	229	188
Bac. pre-oper.	220	179
Sputum positive to negative	135	135
Percentage conversion	59%	77.6%

Reverting again to the 135 patients mentioned above who became negative, it is interesting to note (Table VII) that 41 per cent became negative within one month of the final stage. By the end of three months 59 per cent were negative. At six months the figure had risen to 67 per cent and by the end of one year a total of 78 per cent were found to be non-bacillary and have remained so. Eight patients (6 per cent) were rendered negative by re-operation. The fact that 16 per cent of the group were able to attain negativity more than a year after thoracoplasty and without further surgery is of interest from a prognostic point of view.

TABLE VII.
SPUTUM CONVERSION — 135 PATIENTS

	Percentage
1 month post-operative	41
3 months post-operative	59
6 months post-operative	67
1 year post-operative	78
After 1 year	16
After re-operation	6
	100

PRESENT STATUS

The degree of rehabilitation of patients who have had thoracoplasty measures the economic value of this procedure. Since the outlook without surgery is so grave in these patients, their ultimate recovery and return to work affords the sanatorium worker great satisfaction.

Recent and adequate follow-up information is available on the 188 living patients. The average elapsed time since discharge is four years. The information on file consists variously of review examinations and x-ray films, sputum examinations, patient's reports, and field consultation service reports and films.

It is found (Table VIII) that 117, or 62.3 per cent, of the 188 patients are working. Of these 117 patients, 92 have resumed their former occupation, which in many cases would be considered suitable; a few are doing hard manual work; and others are able to restrict their work or do selected work. Twenty-five have changed their vocational status, some by marriage, some by engaging in clerical or technical work, and others simply by finding something more suited to their needs.

An additional ten patients are considered to be "employable". This group includes some patients who could be working if suitable light work were available, others who are doing occasional light work, and two who do not have to work. In other words, 127, or 67.6 per cent, of these patients are employed or employable. There are 44, or 23.4 per cent, of the living patients who are "unemployed". Included in this group are 26 who still are convalescing at home and 18 who are "unemployable" with a varying amount of actual or fancied post-operative disability.

Seventeen patients, or 9.0 per cent, are in the sanatorium, either continuing the original treatment period (10) or readmitted for further treatment (7). Two of the latter now have non-pulmonary lesions. Of the 17 patients in residence it is considered that probably 10 should be classified as "maximum benefit cases".

TABLE VIII.
WORK STATUS

	No.	Percentage
Employed—Same	92	49.0
New	25	13.3
Employable	10	5.3
Unemployed	44	23.4
In sanatorium	17	9.0
Total	188	100.0

TABLE IX.
SUMMARY

	No.	Percentage
Total patients	229	
Dead	41	17.9
Living	188	82.1
Sputum negative	144*	76.6
Able to work	127	67.6
(* 9 of these were negative before operation)		

NOTE: About two-thirds of the operations covered by this study were done by Dr. R. H. Macdonald, of Saskatoon. It was my privilege to be associated with him from the beginning. His experience and counsel have been available as Consultant in Thoracic Surgery since January, 1937, and are gratefully acknowledged.

I am indebted also to Dr. R. G. Ferguson, Director of Medical Services, to Dr. H. C. Boughton, Superintendent Saskatoon Sanatorium, and to Dr. G. H. Hames, for their continued interest and valued assistance.

RÉSUMÉ

De 1927 à 1940, 312 malades ont eu des thoracoplasties. Les résultats rapportés sont basés sur les

malades opérés depuis au moins deux ans. On ne fit pas l'apicolyse. Les phrénicectomies n'ont été pratiquées que plusieurs mois après les thoracoplasties. Dans la majorité des cas, les principales indications de la thoracoplastie sont la cavitation et le crachat bacillifère. Les principales contreindications sont la présence de lésions trachéo-bronchiques étendues, l'atteinte récente ou progressive du poumon opposé et la dégénérescence du myocarde. On attend moins longtemps qu'autrefois avant de pratiquer la thoracoplastie et l'intégrité du poumon opposé est moins rigoureusement exigée. Le pneumothorax aura été tenté avant de songer à la chirurgie. On ne défend pas l'exercice modéré avant la thoracoplastie afin d'améliorer le tonus vasculaire et la capacité vitale. Notre mortalité fut de 17.9 pour cent, les morts précoces comprises. Les morts plus tardives, imputables à la tuberculose figurent pour 14.4 pour cent du total. Les complications post-opératoires furent l'infection de la plaie dans 10.4 pour cent des cas, la dissémination de la tuberculose au même poumon 10 fois, et au poumon opposé 12 fois, enfin l'otite moyenne tuberculeuse. Quatre-vingts-six pour cent des malades furent congédiés avant un an. Les crachats de 59 pour cent du total des opérés cessèrent d'être bacillifères. Depuis la sortie du Sanatorium, 62.3 pour cent des malades travaillent.

JEAN SAUCIER

OBLITERATIVE VASCULAR DISEASE: TREATMENT BY SYMPATHECTOMY

BY R. I. HARRIS

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TWO types of obliterative vascular disease commonly present themselves as clinical problems, and in both lumbar sympathectomy can be a valuable form of treatment. The two types are thromboangiitis obliterans (Buerger's disease) and peripheral arteriosclerosis.

Buerger's disease is the more important both because it is more common and also because it occurs in young men in the prime of life. Unknown factors initiate a pathological process which manifests itself chiefly in vessels of moderate size in the extremities, more often in the lower extremity. The involved vessels undergo a series of changes, the first of which is a subacute inflammation involving all coats of the artery and spreading to the adjacent vein. During the acute phase the lumen of the artery is occluded by thrombus. The acute phase subsides and is followed by a reparative phase in which the thrombus is organized and often recanalized. Finally, the reparative tissue matures into scar. The disease progresses from segment to segment of the artery in a discontinuous manner, sometimes slowly, sometimes rapidly, sometimes involving large sections of the artery, sometimes small sections. The effect is to produce a diminished blood flow to the extremity which intermittently becomes worse.

The clinical picture usually is clear. The disease occurs chiefly, perhaps exclusively, in young males, and involves their legs four times more frequently than their arms. The symptoms are all due to diminished blood supply to the extremities. The earliest symptoms are *cold feet and tired feet*. Later *intermittent claudication* becomes a conspicuous feature. This sign occurs when the blood supply is diminished to a point when it is adequate for the muscles while they are at rest but inadequate while they are working. The waste products of the metabolism of muscle activity accumulate in the muscle because the flow of blood is inadequate to remove them. Where they have accumulated in sufficient concentration muscle function is impaired and the patient experiences pain and muscle cramp. A short rest enables the circulation to wash out the metabolites and permits the muscles to function again until a further accumulation of metabolites occurs. The patient, therefore, presents a very distinctive syndrome. After a certain period of muscular work, he becomes disabled by pain and cramps in the muscles. The pain becomes so severe that he must stop: a comparatively short rest restores the situation and he can again undertake the amount of muscular effort necessary to cause the

accumulation of metabolites. Since the lower extremities are the common site of Buerger's disease, intermittent claudication is most often induced by walking. At a given stage in the disease, claudication is induced by a constant amount of work. The patient's story, therefore, is "after walking a certain distance, the pain in my legs is so severe that I have to stop. After I rest a few minutes, I can again walk the same distance and this is repeated as long as I walk." The symptoms come on rapidly with rapid walking and slowly with slow walking.

As the disease progresses *colour changes* occur in the foot. The dependent foot is rosy purple, indicating capillaries filled with blood circulating sluggishly. If the foot is elevated it blanches rapidly to a marble whiteness, indicating that the capillaries empty more rapidly by gravity than they can be filled from the partially obstructed arterioles. The colour changes are of some value in the diagnosis of the disease since they indicate in a dramatic and easily recognized form a circulatory disturbance which demands investigation.

The pathological changes sometimes involve the superficial veins (15 per cent of cases) and when this occurs it presents a pathognomonic and easily recognized manifestation of the disease, *migrating thrombophlebitis*. It attacks chiefly the radicles of the long saphenous vein on the dorsum of the foot and the lower half of this vein itself. The involved segments exist as tender red streaks in the skin which slowly spread along the course of the vein, often skipping a segment.

As the disease progresses on its intermittent course, *diminution or absence of pulsation* in the dorsalis pedis and posterior tibial arteries becomes evident.

In the advanced stage when the flow of blood is barely sufficient to maintain vitality of the part, a new type of pain appears, situated in the foot and constantly present. It is aptly called *rest pain*. Since it is worse at night it causes much loss of sleep and rapidly undermines the morale of the patient. It is this persistent and intolerable pain which warns of impending gangrene and drives the patient to welcome amputation.

When the impairment of circulation has reached any considerable degree of severity *trophic changes* appear. The skin becomes thin and pigmented, the nails furrowed and dry. An important manifestation is poor response to in-

jury. Trivial abrasions, which in a normal foot would be of no consequence, in the presence of a feeble circulation can initiate a disastrous chain of events. Small wounds fail to heal and become portals through which infection enters. Infection is poorly combated and may precipitate gangrene.

Gangrene is the ultimate manifestation of this progressive arterial disease.

VASOSPASM IN BUERGER'S DISEASE

Though the essential pathological feature in Buerger's disease is an organic occlusion of vessels and mechanical interference with blood flow, in many cases there is superimposed an element of *vasospasm* which is of great importance. One might think that the presence of serious obliterative vascular disease would initiate a protective reflex which would ensure the maximum flow to the extremity by the dilatation of all arterioles. Such, however, is not the case. Indeed, Leriche believes that the presence of thrombosis initiates reflex vasospasm rather than dilatation. It certainly happens often that a patient with Buerger's disease has organic occlusion of the arteries of moderate size plus spastic occlusion of the arterioles of the collateral vessels. If tobacco plays any part in Buerger's disease, it probably is in this connection. I am not convinced that tobacco has anything to do with the initiation of the organic disease in the vessels (thromboangiitis obliterans). But tobacco does cause vasospasm and by so closing the collateral channels it may easily become a secondary factor of considerable importance. Nearly every case of Buerger's disease is accompanied by some degree of vasospasm, sometimes much and sometimes little, and this fact is of great importance in the planning of treatment.

PERIPHERAL ARTERIOSCLEROSIS

When the characteristic arteriosclerosis of advancing years attacks the vessels of the limbs it can result in obliteration of the lumen of vessels with resulting diminution of blood flow. The pathology is entirely different from that of Buerger's disease, though the result and hence the clinical picture is similar. In this disease, the primary change is the familiar degeneration of the media, Mönckeberg's sclerosis. Its presence in vessels of moderate size and the accompanying medial thickening cause narrowing or obliteration of the lumen. When thrombosis

occurs there is a sudden diminution in the blood flow with consequent sudden increase in the severity of symptoms. Whereas Buerger's disease is an inflammatory lesion of blood vessels, peripheral arteriosclerosis is a degenerative disease affecting only the artery.

Though the pathology of arteriosclerosis is so profoundly different from that of Buerger's disease, the clinical manifestations naturally are similar, since both are manifestations of diminished blood supply to the extremities. Cold, tired feet, intermittent claudication, colour changes and trophic changes, passing on to rest pain and gangrene, mark the progress of arteriosclerosis just as they do Buerger's disease. There are, however, some important differences. Arteriosclerosis is a disease of old age and it affects females as well as males. Moreover, it is but part of a generalized disease and other manifestations are often present, such as cerebral arteriosclerosis, renal disease, or cardiac disease.

TREATMENT

This paper is concerned chiefly with the value of sympathectomy in the treatment of obliterative vascular disease. But since it should not be used indiscriminately in every stage, and in every case, something must be said of other and more conservative forms of treatment and of selection of cases.

In the earlier stages of these obliterative vascular diseases, simple conservative measures can do much to alleviate symptoms. Modified habits of life which will permit less standing and walking should be attempted. It is extremely important in this country that the feet should be kept warm and dry by woollen socks and boots which are not tight. Many cases of frostbite are not simple frostbite but are the effect of cold upon feet which have inadequate circulation. This factor should always be remembered in every case of frostbite. Care should be taken to avoid minor injuries to the toes and feet. An open wound enormously complicates the problems to be faced and often precipitates disaster, *e.g.*, gangrene. Hence ingrown toenails, injuries incurred while paring the nails, scratches from nails in the boots, abrasions, etc., should be vigilantly guarded against. It is in this stage that tobacco should be prohibited. There is reasonable evidence that it induces vasospasm and by this means diminishes further the already inadequate blood supply. Alcohol has a beneficial effect because

of the vasodilatation it produces. A glass of whisky in the evening relaxes vasospasm and results in temporary increase in blood flow.

My experience with Pavaex therapy has not been entirely satisfactory. Some cases have been benefited, some have not been benefited; some I thought were actually made worse. The instrument seems ideally suited to develop a collateral circulation in a limb suffering from impaired blood supply. That it does not always do so in Buerger's disease and peripheral arteriosclerosis I believe to be due to vasospasm in the peripheral arterioles. These are not passive tubes to be opened wider by mechanical force. On the contrary, they are living and elastic structures. Pavaex therapy may temporarily increase the flow through them against the resistance of vasospasm, but when the machine is stopped vasospasm again takes control.

Though conservative measures are sometimes of great merit and should be employed in all early cases, most cases slowly progress to the point where increasing impairment of circulation causes serious interference with function and activities; intermittent claudication is constant, severe and easily induced; rest pain is present, and trophic changes or impending gangrene make their appearance. When this stage has been reached, lumbar sympathectomy should be considered.

The success of lumbar sympathectomy in Buerger's disease and peripheral arteriosclerosis is dependent upon the existence of a degree of vasospasm superimposed upon the obliterative vascular disease and capable of being abolished by the operation. The amount of vasospasm which co-exists with obliterative vascular disease varies from case to case; in some it is a conspicuous feature, in others it is nearly or completely absent. Preoperative tests to determine the degree of vasospasm are of some value, though even when these tests show little or no vasospasm to be present some benefit often is obtained by sympathectomy. Two tests are in common use, the Landis test and spinal anaesthesia. In my experience spinal anaesthesia is the more informative. The Landis test is dependent upon reflex dilatation of peripheral vessels when the hands are dipped in hot water. Spinal anaesthesia paralyses the outflow of sympathetic fibres. It more closely reproduces the effect which will be produced by lumbar sympathectomy. Its effect

often is to demonstrate some degree of vasospasm when the Landis test shows none. Both tests depend upon measurements of skin temperature under controlled conditions. A rise in skin temperature indicating increase in blood flow resulting from release of vasospasm.

If pre-operative tests show that the skin temperature of the foot rises 3° C. a good result from lumbar sympathectomy can be predicted. There are, however, many cases in which the rise of skin temperature under test is less than this or even non-existent. The question at once arises as to whether such cases should be submitted to sympathectomy. It has been my experience that some even of these cases often receive such benefit from sympathectomy as to justify its use. Even if the rest pain only is relieved, the result is well worth while, since amputation is avoided or is postponed for years. My present practice is to use lumbar sympathectomy for all severe cases irrespective of the pre-operative tests. If the pre-operative test indicates a considerable degree of vasospasm to be present, the decision is easy since valuable improvement can be promised by sympathectomy. If the pre-operative test indicates little or no vasospasm, the decision is difficult since the only alternative to sympathectomy is amputation. Experience has proved that some improvement can be obtained in many cases when the pre-operative tests give no promise of it. Under these circumstances it seems wise to perform lumbar sympathectomy first and reserve amputation until all other measures have failed.

If sympathectomy is to be used, it should be performed *before* gangrene and open trophic lesions have developed. The task of combating infection and separating off gangrenous tissues add greatly to the demands upon the circulation. The improvement gained by sympathectomy might be great enough to deal with the enhanced problem of gangrene and infection. Often the patient's pain does not disappear until all open lesions have healed.

In every severe case of Buerger's disease, sympathectomy should be given serious consideration and most cases, in my opinion, at some stage should be given the benefit of this operation. Such patients are young adult males in the prime of life and every attempt to restore them to self-supporting existence is justifiable. The situation is different in peripheral arteriosclerosis. The victims of this disease are ad-

vanced in years. For the most part they are past the wage-earning period. Moreover, their vascular disease is such as to make possible the existence of serious vascular lesions in other organs, notably brain, heart and kidney. Cases of peripheral arteriosclerosis to be treated by sympathectomy must be selected with care. Only those without organic disease, without serious vascular disease elsewhere, and whose life cannot be slowed down to a tempo within the boundaries of the circulatory sufficiency are suitable cases.

RESULTS OF LUMBAR SYMPATHECTOMY IN OBLITERATIVE VASCULAR DISEASE

During the past ten years, "A" Division of the Department of Surgery, Toronto General Hospital, has performed sympathectomy 39 times for vascular disease (Table I). Two of these cases were Raynaud's disease, 1 was an obscure vascular lesion in a young female, 13 were cases of peripheral arteriosclerosis and 23 were cases of Buerger's disease.

TABLE I.
SYMPATHECTOMY FOR VASCULAR DISEASE
SURGICAL DIVISION "A"—TORONTO GENERAL HOSPITAL
1929 TO 1939

	Good	Fair	Poor	Total
Buerger's disease	13	7	3	23
Arteriosclerosis	5	1	7 (3D)	13
Raynaud's disease	1	..	1 (1D)	2
Other conditions	1	..	..	1
	20	8	11	39

We have been able to follow all of these cases carefully and can now assess the value of sympathectomy. Table I classifies the results as good, fair and poor. Good results mean striking relief of pain and intermittent claudication, increased ability to work and all of this sustained to the present. Fair results mean only slight or moderate improvement in circulation or more improvement which was not sustained or relapse with gangrene after a period of relief. Poor results mean little or no improvement obtained by sympathectomy. On this basis it will be seen that in Buerger's disease a very satisfactory percentage of good results was obtained (63 per cent) as well as 30 per cent of fair results. The results in arteriosclerosis are not so striking. Neverthe-

less, 40 per cent of good results were obtained. When one considers that most of these cases were thus spared amputation it is a result of some importance.

It is perhaps justifiable to illustrate the results by relating the histories of two cases, one of Buerger's disease and one of peripheral arteriosclerosis. In diseases such as these, for which we have no cure in the strict sense of the word, we must rely upon measures which give relief and a few brilliant results are justification for advocating the use of a surgical procedure even though by the very nature of the disease it cannot always be successful.

A CASE OF BUERGER'S DISEASE SUCCESSFULLY TREATED BY SYMPATHECTOMY

J.J., age forty-one, first seen in April, 1932, complaining of pain in the feet and calves. These symptoms had commenced five years previously with aching pain in and abnormal coldness of the right foot. The left foot was similarly involved later though when first seen this was the more painful extremity. Severe intermittent claudication occurred after walking two blocks. He had many attacks of migrating thrombophlebitis. Rest pain was present in the left foot on admission. He was nearly completely incapacitated by pain and had lost more than 50 per cent of time from his work in the year prior to admission.

Examination on admission showed cold feet with marked postural colour changes. Some lesions of migrating thrombophlebitis were present. There was no pulsation in the pedal arteries of either foot. Spinal anaesthesia caused a rise of skin temperature of 4° C. in the left foot and 6.5° C. in the right foot, indicating an accompanying vasospasm of considerable degree.

As the left foot was the source of much the more severe symptoms, a left lumbar sympathectomy was performed on May 7, 1932. This was followed at once by increased warmth and improved colour in the left foot and complete disappearance of the rest pain. He returned to work in a few weeks and continued at this until July, 1933, when he returned of his own accord to have his right side operated upon. During the interval he had worked particularly long hours as mate on a lake freighter, his duties at certain times necessitating his remaining on the bridge for twenty hours at a stretch. A right lumbar sympathectomy was performed on July 13, 1933. Since then he has been continuously at work.

It is not beside the mark to remind you that the prosperity of industry depends not merely upon the improvement of manufacturing processes, not merely upon the ennobling of the individual character, but upon a third condition, namely, a clear understanding of the conditions of social life on the part of both the capitalist and the operative and their agreement upon

A CASE OF PERIPHERAL ARTERIOSCLEROSIS SUCCESSFULLY TREATED BY SYMPATHECTOMY

J.T., age sixty-three, for a year had been incapacitated by cold painful feet, intermittent claudication, rest pain and finally by the onset of gangrene in his right great toe. Postural colour changes were marked. No pulse could be felt in the pedal arteries of either foot. Pre-operative tests gave a rise in skin temperature of 4° C. He refused operation and left hospital. A month later he returned, driven by the intolerable rest pain to a willingness to submit to anything. The gangrene of the great toe had extended to the metatarso-phalangeal joint. Right lumbar sympathectomy was performed in April, 1930, and the gangrenous great toe disarticulated at the metatarsophalangeal joint. Operation was followed immediately by complete disappearance of the rest pain. The wound of the toe slowly healed. The skin temperature of the right foot was appreciably higher than that of the left and remained so. He remained free from discomfort and led a life of moderate activity for five years before he died of coronary thrombosis.

CONCLUSIONS

1. The two obliterative vascular diseases commonly met with are Buerger's disease and peripheral arteriosclerosis.

2. Though the pathological changes are profoundly different in the two diseases, the result in each case is an intermittently progressive slowing of the circulation which manifests itself by a distinctive clinical picture.

3. Many cases of either disease have an associated degree of vasospasm which contributes materially to the diminished blood flow. The degree of this vasospasm can be measured by pre-operative tests such as spinal anaesthesia and Landis test.

4. In all severe cases of Buerger's disease and in selected cases of severe peripheral arteriosclerosis the operation of sympathectomy should be given serious consideration. If the pre-operative tests result in a rise in skin temperature of 3° C. or more, a beneficial result from operation can be assured. Even a lower rise in skin temperature does not entirely preclude the possibility of improvement sufficiently great to justify the procedure.

common principles of social action. They must learn that social phenomena are as much the expression of natural laws as any others; that no social arrangements can be permanent unless they harmonize with the requirements of social statics and dynamics; and that, in the nature of things there is an arbiter whose decisions execute themselves.—Science and Culture, T. H. Huxley.

FETAL SHOCK

TREATMENT WITH DESOXYCORTICOSTERONE ACETATE

(A PRELIMINARY REPORT)

BY MELVYN BERLIND, M.D.

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THE writer has for some time been interested in the approach to the treatment of shock by means of salt plus adrenal cortical hormone. The recent active synthetic preparation of this hormone, the so-called desoxycorticosterone acetate, coupled with the appearance of an interesting paper by Perla^{*1} and co-workers, has stimulated him to treat a group of newborns, who were born in shock (*vide infra*) with this new preparation. This group to date is small, covering but twelve patients, but as the results were of such striking character, it was decided to publish these cases as a preliminary report, with the hope that other workers interested in this field would be encouraged to further study of this fascinating problem.

The relationship of adrenal insufficiency and shock has been known for many years, as is witnessed by the large number of papers published on the subject. (John Scudder in his book on Shock, a classic, gives a bibliography of 533 references, though not all pertaining to adrenal insufficiency, and this only to 1939, from which date many more articles have appeared). These papers dealt for the most part with animal experimentation, in which varying sub-lethal and lethal doses of histamine (first suggested as the cause of shock by Dale² in 1910) were given to a variety of animals, mice, rats, guinea pigs, and the shock so produced counter-acted by means of salt and adrenal cortical hormone. The use of saline infusions alone have not been without success, as seen by Perla³ who observes that "administration of large amounts of physiological saline some hours prior to the production of severe shock (by histamine) enhanced the resistance in rats, enabling them to withstand about twice the lethal dose of histamine for normal animals." Again, shock produced by intestinal obstruction in dogs has been treated therapeutically by means of cortical hormone with satisfactory results.⁴ Finally, the close

similarity of adrenal insufficiency and shock was noted by Harrop and Weinstein⁵ in 1933, and their work, along with that of Swingle,⁶ presaged the established use of adrenal cortical hormone in the latter condition.

Desoxycorticosterone acetate has repeatedly proved its value in the treatment of Addison's disease, as shown by the report of a number of papers.^{7 to 12} Equally important, though somewhat neglected by the over-enthusiastic worker, have been the reports of unfavourable responses from indiscriminate and excessive use of this synthetic product. Ferrebee *et al.*¹³ have stated that marked oedema, hypertension and congestive heart failure are sometimes seen in the uncontrolled, ill-advised or over-treated case. Again, experimental evidence in rats (and if we accept the pleasing results we must be prepared to accept the unpleasing results) indicates that atrophy of the normal adrenal cortex may follow excessive desoxycorticosterone therapy in normal animals.¹⁴ Thus, a recent timely study and report on the therapeutic value of desoxycorticosterone¹⁵ concludes as follows: "The known complications which may arise from the clinical use of desoxycorticosterone makes its application to therapy a procedure involving some risk, excepting in the hands of clinicians provided with adequate facilities for identifying and controlling any difficult situations which may arise. Until many details of its action are more thoroughly understood, its use should probably be restricted." An editorial¹⁶ the following week in the same Journal again cautions against the possible dangers from indiscriminate use of desoxycorticosterone and accepting reports, however brilliant, based on unconfirmed results. The *New York State Journal of Medicine* of July 1, 1940, editorializes in part as follows: "Inquiry has elicited from surgeons who have used this means (desoxycorticosterone acetate) of shock prevention extremely favourable reports of its effectiveness."

It is apparent from the above discussion that this new synthetic product, desoxycorticos-

* Perla's recent and untimely death at the age of thirty-nine has deprived the profession of a brilliant and original pathologist.

terone acetate, is not one that should be hastily thrust upon the medical profession, to use it under all and any conditions of shock, irrespective of cause or the physical status of the patient. A glance at the above papers is proof sufficient that complications are not uncommon, such as œdema, continued and dangerous hypertensive states and congestive heart disturbances in those cases in which the patients have not been properly evaluated as to their cardiovascular-renal status. Similar and other complications have been found in cases where excessive amounts of the hormone have been used, or where the relative amounts of saline infusions and hormone injections have not been proportionately gauged. Again, even in the Addisonian syndrome the administration of desoxycorticosterone is not a complete substitute for the adrenal cortex. This is based on the findings of Kendall,¹⁸ Grollman¹⁹ and Long²⁰ who in their various papers have shown qualitative as well as quantitative differences in the preparations and fractions derived from the adrenal cortex. Thus, amongst others probably yet to be found, are corticosterone, desoxycorticosterone acetate (to date the most potent) and the so-called "cortin fraction". Only time and much further study will determine the uses and dangers of these products, given alone or in various combinations, in the treatment of disease in animal and man.

It was with a rather respectful attitude towards the properties of desoxycorticosterone that the writer undertook to study its effects on a group of newborns born, in what has here been termed "fetal shock". So far as the author is aware, the phrase "fetal shock" has not been previously employed in medical literature, and thus, though the expression will be readily understood by anyone doing obstetrics, an explanation is in order. By fetal shock is meant the state of a newborn, which immediately after delivery, usually difficult, is that of a living limp traumatized infant, with diminished muscular tone in arms, legs and neck, pale greyish in colour, with poor pharyngeal reflex, who breathes with much difficulty following efforts at resuscitation, the early attempts of which are mere gasps, and whose heart action is rapid, unduly slow, or irregular. It is a not unfamiliar picture. In keeping with the general conception of shock as understood by the profession, the child might be said to be in a state of cardiovascular collapse. Massive cere-

bral or sub-tentorial hæmorrhages are here excluded, though multiple petechial hæmorrhages might not be an uncommon finding.

Blood pressure readings on these newborns have in several instances been lowered and in others not obtainable by the usual method of radial pulse palpation. In place of the average reading of 50 to 60 mm. at birth in the normal full-term child, (increasing about 2 mm. per day for the first ten days), determinations of zero to 30 or 40 have been found. These refer to systolic readings, the diastolic not being obtainable by the above method. As further work is being done at present on blood pressure determinations in newborns, both normally born and those in fetal shock, with expected publications of the results, only in a few instances (cases 2, 6 and 8) will the tension changes be here given. Accurate standardization is being awaited.

Again, the same difficulty has arisen in respect to hæmoglobin and hæmatocrit determinations. The hæmoglobin and blood volume determinations, as well as the plasma-cell relationship vary to such an extent in the newborn from hour to hour, and decidedly from day to day, that, first of all, an attempt at standardization of the normal child is being made, with the subsequent hope of comparing these findings with those in the child with fetal shock. Until these findings will be sufficiently accurate to be of clinical value as diagnostic criteria of fetal shock, reference to them will be here omitted. Other factors connected with shock in adults, such as determination of blood chlorides, potassium, calcium, hydrogen ion concentration, carbohydrate metabolism, etc., are also here left out, as being for the present unstandardized in normal newborns, let alone those in fetal shock. Further details will be worked out and subsequent papers, it is hoped, will determine the value of many of the above problems.

In what type of delivery is the newborn most likely to suffer from the condition of fetal shock? Generally speaking, the more difficult the delivery, the more trauma imposed and the more liable is the child to suffer from fetal shock. Thus, the condition is found in difficult forceps operations, especially with protracted and forceful rotation from posterior positions, (often a lapse of art); in versions and extractions in primiparæ with dry labours or large babies; in breech extractions in primiparæ with moderately contracted pelvis or,

TABLE I.
DESOXYCORTICOSTERONE ACETATE* IN THE TREATMENT OF FETAL SHOCK

No.	Case	Age	Para.	Pelvis	Term or premature	Duration labour, in hours	Position	Type of delivery	Condition of newborn	Weight sex	Treatment	Subsequent treatment	Discharge day, weight	Condition and remarks
1	MO	32	1	Gynaecoid	Term	38	ROP	Mid-forceps; lock and key rotation; difficult.	Pallid, limp, no spontaneous respiration, absent pharyngeal reflex.	7 lbs. M.	D.A. 0.5 c.c.; artificial respiration carbon dioxide oxygen (author's minus trap 23).	D.A. 0.25 c.c. daily for 3 days; 50 c.c. N. saline by hypo day of delivery.	10 7 lbs. 6 ozs.	Began nursing third day, nursed well; colour good; excellent condition.
2	AG	27	1	Gynaecoid	Term	22	RSP	Breech extraction; forceps on after-coming head; duration of extraction 12 minutes.	Fetal shock; respiration poor, soon rapid, laboured; temperature soon rose to 103; blood pressure 30.	9 lbs. 2 ozs. F.	D.A. 0.25 c.c. twice 1st day; 100 c.c. N. saline by hypo; alpha lobeline; artificial resuscitation, tracheal cath.	D.A. 0.2 c.c. daily for 10 days; after 0.1 c.c. daily for next 10 days.	24 9 lbs. 9 ozs.	Slight oedema of ankles on tenth day, hormone decreased, oedema cleared up; diagnosis: possible adrenal hemorrhage, subsequent regeneration, condition good.
3	LG	18	1	Gynaecoid	Pre-mature 36 weeks	2(?)	?	Rapid, precipitate; child found in bed.	Pallid, weak, apnoeic; fluid in lungs; poor cardiac action; almost "drowned" in amniotic fluid.	4 lbs. 7 ozs. F.	D.A. 0.1 c.c.; tracheal cath.	D.A. 0.1 c.c. daily for 3 days; incubator.	12 5 lbs.	Good cry; gaining well; weaned; condition good.
4	MB	21	2	Platypelloid	Term	36	LSP	Breech extraction; Piper forceps on after-coming head; difficult due to large head and contracted pelvis.	Poor; pallid; no spontaneous respiration; limp; (bilateral undescended testicles).	8 lbs. 2 ozs. M.	D.A. 0.2 c.c.; 100 c.c. N. saline, tracheal cath. carbon dioxide-oxygen.	D.A. 0.2 c.c. daily for 2 days; 0.1 c.c. for next 2 days.	10 8 lbs. 2 ozs.	General condition good; nurses well.
5	TS	29	2	Platypelloid	Term	10	ROP	Repeat Caesarean section, laparotomies; gas-oxygen, ether.	Pale, greyish colour; cry poor; limp; gasps for air; drowsy.	7 lbs. 7 ozs. M.	D.A. 0.2 c.c.; 50 c.c. N. saline by hypo; alpha lobeline.	D.A. 0.1 c.c. daily for 3 days; then every 2nd day for 3 doses.	12 7 lbs. 12 ozs.	Excellent; takes bottle well; believe excess anaesthesia and ether cause of fetal distress.
6	TG	30	1	Gynaecoid	Term	28	LOP	Version and extraction; duration 20 minutes.	Weak, poor cry; respiration induced by tracheal cath; limp; blood pressure 50 mms.	7 lbs. 9 ozs. F.	D.A. 0.2 c.c.; 80 c.c. N. saline by hypo; tracheal cath.	D.A. 0.1 c.c. daily for 4 days; 50 c.c. N. saline 2nd day.	12 7 lbs. 7 ozs.	Condition good; nurses well; blood pressure 52 mms.

7	MS 27	1	Gynaecoid	Term	48	ROA	Mid-forceps; difficult pull; large fetal head.	Cry good at birth, soon weak; respiration poor; no sign of cerebral hemorrhage.	9 lbs. 4 ozs. F.	D.A. 0.2 c.c.; 100 c.c. N. saline by hypo; oxygen and carbon dioxide.	D.A. 0.1 c.c. daily for 5 days; 50 c.c. N. saline on 2nd and 3rd day.	10 9 lbs. 1 oz.	Condition good, spite of weight loss; respiration normal; nursing well.
8	SB 22	1	Android, slight	Term	25	LSP pro-lapsed	Breech extraction; Piper forceps on after-head; manual removal of adherent placenta.	Fair; respiration poor at first, though spontaneous later rapid; temperature 102; blood pressure 20 mms.; abdomen hard.	7 lbs. 3 ozs. M.	D.A. 0.25 c.c.; 100 c.c. N. saline; tracheal cath. oxygen given.	D.A. 0.1 c.c. daily for 12 days; then 0.1 c.c. every other day for 6 doses; increased fluid intake.	27 7 lbs. 12 ozs.	Condition good; similar to case 2.
9	GB 21	1	Gynaecoid	Term	17	ROP	Spontaneous rotation from ROP to ROA; spontaneous delivery.	Cry weak; tone of muscles poor; respiration in short gasps; fetal heart good 5 mins. before birth.	6 lbs. 6 ozs. M.	D.A. 0.1 c.c.; alpha lobeline.	D.A. 0.1 c.c. daily for 3 days; marked improvement 2nd day.	10 6 lbs. 9 ozs.	Good; nursing well; cause of fetal distress?
10	MT 25	1	Gynaecoid	Term	29	OP	Mid-forceps, without rotation, delivered as occiput posterior; easy pull.	Apnoeic; limp; pallid; cardiac action poor; weak pharyngeal reflex; fetal shock picture.	8 lbs. 1 oz. F.	D.A. 0.2 c.c.; 100 c.c. N. saline; coramine 2 minims.	D.A. 0.2 c.c. for 1 day, followed by 0.1 c.c. daily for next 4 days.	9 8 lbs. 3 ozs.	Good; nursing well; good cry.
11	AB 35	3	Gynaecoid	Pre-mature, 37 weeks	8	ROA	Spontaneous; uterine bleeding as result of fibroids, before and during delivery.	Weak, limp; respiration shallow; poor cry; colour poor, pallid.	4 lbs. 11 ozs. F.	D.A. 0.1 c.c.; 50 c.c. N. saline; whole blood intramuscularly.	D.A. 0.1 c.c. daily for 4 days.	10 5 lbs.	Good; takes bottle well; good cry; umbilical hernia.
12	SM 42	1	Gynaecoid	Term	23	ROA	Low forceps; inertia uteri; gentle pull required.	Poor, weak, cry; respiration spontaneous; pale, greyish; muscle tone poor.	7 lbs. 7 ozs. M.	D.A. 0.1 c.c.; 100 c.c. N. saline.	D.A. 0.1 c.c. daily for 4 days; 50 c.c. N. saline 2nd day.	12 7 lbs. 7 ozs.	Good; weaned, takes bottle well; colour improved.

*The desoxycorticosterone acetate used in these cases was DOCA, kindly supplied by Roche-Organon, Inc., of Nutley, N.J. One c.c. of Doxa = 5 mg. of desoxycorticosterone acetate (referred to in the case reports as D.A.). The writer wishes here to thank Dr. Leo A. Pirk, of the above firm, for his many kindnesses and helpful suggestions in the preparation of this paper.

with what is technically equivalent, large sized babies. In difficult breech extractions, notably when during the delivery, the operator's thumbs are unduly pressed against the fetal kidney area, hæmorrhages, in many instances of large size, are found in the adrenal cortex, on one or both sides. Here the typical picture of adrenal hæmorrhage in the newborn is very often found: hyperpyrexia within a few hours following delivery, forced and rapid respiration of the pneumonic type,²¹ and occasionally a palpable tumour mass. The writer believes that it is particularly in this type of case, a difficult breech extraction with possible adrenal hæmorrhage, that desoxycorticosterone will find its most useful purpose in the treatment of the various types of fetal shock. The hormone can here be used in small doses over a protracted period of time, to allow absorption of the blood clot and regeneration of the damaged adrenal cortex, or compensation by hyperplasia of the uninjured adrenal gland. The hypotension found in adrenal cortical hæmorrhage in adults was also noted in the two fetal cases (2 and 8) cited below, pressures of 20 and 30 mm. being found. Perhaps with further standardization, a hypotension, along with hyperpyrexia and hyperpnœa may be used as an additional diagnostic sign of adrenal hæmorrhage in the newborn.

Operative procedures are not entirely to blame. Fetal shock might conceivably be found in rapid, precipitate deliveries, where the short-lasting "explosive trauma," if not at once fatal, may leave the infant in a state of concussion collapse and shock. Spontaneous deliveries are not exempt, where prolonged labour with pounding of the fetal skull against a firm perineum, for a shorter or longer period of time, might produce fetal distress. One can readily see the vulnerability of the premature infant, with its delicate fetal skull, under such circumstances. It was to avoid such a condition, fetal shock and cerebral hæmorrhage, that the writer²² advised routine episiotomy in the delivery of premature infants in all primiparæ and in those multiparæ with rigid or scarred vulvar outlets. He is pleased to learn that the procedure is at present being widely practised with satisfactory results.

Finally, fetal shock might be found in the child delivered by Cæsarean section, where previous excessive analgesia coupled with pro-

longed general anæsthesia has been used. This might in part account for the over-high fetal mortality found in Cæsarean sections.

SUMMARY

A preliminary report is here presented of the treatment of "fetal shock" with desoxycorticosterone acetate plus saline infusions.

In a group (not all delivered by the writer) of 12 newborns, without cerebral hæmorrhage, the treatment was followed by excellent results in all cases. In two breech extractions adrenal hæmorrhage of the newborn appears to have been present. Both cases responded well to prolonged therapy with desoxycorticosterone acetate and saline. Indeed, it is in this type of case that adrenal cortical hormone might find its most important use in fetal shock. So much so, that the writer feels justified in advising routine desoxycorticosterone administration, along with saline infusions, in difficult breech extractions, especially in primipara with slightly contracted pelvises or with large babies.

The rôle that this new synthetic adrenal cortical hormone, desoxycorticosterone acetate, has played in the successful outcome of the entire group is difficult to estimate. One can only say that in many instances the condition of the child, born in fetal shock, presented an unusually healthy normal appearance within 24 hours following such therapy. Had the condition of the infant not been known, it would be difficult, on seeing the child for the first time on the second or third day, to believe that birth was attended with such fetal distress. In spite of these encouraging results, further studies will of course be required before routine administration of this new potent adrenal cortical hormone can be recommended in all cases of fetal shock.

It appears to the writer, finally, that, given a similar group of cases deprived of desoxycorticosterone acetate, some mortality would have accrued.

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LOCAL ANÆSTHESIA IN OBSTETRICS*

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IN the Book of Genesis, one reads how the Lord punished Eve for her shortcomings. He condemned woman to a woeful future with the following words, "I will greatly multiply thy sorrow and thy conception; in sorrow shalt thou bring forth children".

We have come to realize this to be so true! Childbearing has become increasingly more difficult and what was once known as a physiological process, seems now to be less physiological and more aptly termed a "painful ordeal".

There has been a great tendency to court general favour by advertising painless childbearing, but the foremost duty of every obstetrician should be an earnest endeavour to make childbearing safe for the mother and also safe for the baby. As a secondary consideration, he should try, as much as modern science will allow, to alleviate the pain of labour. There is no need to use antiquated methods which do not measure up to present-day standards.

Obstetrical analgesia is too complicated a subject for me to discuss in the time at my disposal. I do not wish to offer destructive criticism but rather to suggest methods used in some types of complicated cases. This work was prompted by the scientific investigations of different men who are more directly connected with the product of labour, the newborn baby and the future development of this baby. I shall only refer to that part of their work referable to my subject.

Snyder and Rosenfeld¹ show beyond question that movements of respiration do not start suddenly at birth but occur in regular rhythm during the latter third of intra-uterine life. There is no exchange of gaseous materials but rather inspiration and expiration of amniotic fluid. For this reason, an infant should take

its first breath within a few seconds of extra-uterine life. Any baby who does not breathe within thirty seconds after delivery must be profoundly affected by something.

Yant² has shown that brain cells need oxygen more than other cells of the body. One minute of complete lack of oxygen is enough to cause their death. Schreiber³ follows further to show that certain degenerative changes in the brains of older children can be traced to asphyxia at birth and he has suggested that, in many cases, excessive sedation of the mother may be the causative factor.

Kotz and Kaufman of George Washington University, are strong advocates of analgesia. However, they publish a series of 200 cases of which 100 received ether and paraldehyde per rectum. The average time for the first breathing was 39.5 seconds. One hundred control cases received no analgesia. In this group, the average time for the first breathing was 9.8 seconds.

With anoxia and asphyxia playing such an important part in the future outcome of the baby, one should think twice before giving any sedative which is a respiratory depressant. De Lee of Chicago says, "Since Schreiber has proved incontestably that asphyxia causes cerebral damage, regarding anæsthesia and analgesia, we had better retrench a little. We have gone entirely too far in relieving pain at childbirth."

I would like to emphasize the work of Cole and Kimball⁴ in Detroit. They have investigated a series of 5,000 deliveries of all types. Many received heavy doses of sedative such as, paraldehyde, ether, nembutal, sodium pentothal, morphine, or scopolamine. In addition, the different types of anæsthetic used at the time of delivery were investigated; these were ether, nitrous oxide and oxygen, cyclopropane

* Read at the Seventy-second Annual Meeting of the Canadian Medical Association, Winnipeg, June 26, 1941.

and spinal anaesthetics. Their results are very enlightening. In summary, they are: (1) The most important single factor in the etiology of asphyxia is prematurity. (2) Cases where no sedation was given and where there was a hard precipitate type of labour showed the next most common group of asphyxia. (3) Dystocia and difficult forceps delivery played a very important part. (4) Sedatives, in any amount, definitely increase the amount of asphyxia in the baby in direct proportion to the amount given. (5) General anaesthesia in any amount increases the incidence of asphyxia in the baby in direct proportion to the duration of the anaesthetic.

It is our opinion, in the Royal Victoria Montreal Maternity, that large doses of sedatives, especially in the complicated case, tend toward trouble, both in the mother and in the baby. This is accentuated if, of necessity, a long general anaesthetic is used to terminate the labour. We have observed three methods in our clinic: (1) where different forms of analgesia were given in fairly heavy doses; (2) where the more conservative administration of morphine or heroin was given in graduated doses; (3) where little or no sedation was given during labour.

My opinion is that the course in the middle of the road is usually the safest.

However, I am chiefly interested in bringing before you the treatment of the abnormal obstetrical case. Here it is essential to control the amount and the timing of the sedatives during labour. It is even more important to control the type and amount of general anaesthetic. To simplify the discussion, I will divide these cases into three groups: (1) the toxic case especially if labour is before term and the baby is premature; (2) the breech case; (3) Caesarean section.

Group 1.—The toxic mother is more prone to bleed excessively at the time of delivery. She is also very susceptible to puerperal sepsis. I would suggest that both these conditions are more prone to occur with heavy doses of sedative during labour and more especially if she has a long general anaesthetic.

Incidence of fetal mortality in the premature is very high. This is accentuated in the premature baby born from a toxic mother. It is agreed that there are many factors concerned but asphyxia plays a major rôle. In our public

service, we have treated these cases as follows: repeated doses of heroin can be given but we are most careful not to give too large a dose within four hours of delivery. When the pains are excessively strong or, if the patient is tired out and restless, it is necessary to give a graduated dose (heroin gr. 1/24); this can be repeated to within two hours of the expected time of delivery.

When the patient has entered the second stage of labour, nitrous oxide in combination with a high percentage of oxygen is given to relieve the hard bearing-down type of pain. As the fetal head begins to extend with the accompanying bulge of the perineum, the patient is put in the lithotomy position and the perineum is injected with 1 per cent novocaine plus adrenalin. This is the block type of injection to catch the pudendal nerve and a fork-like injection to catch the sensory branches of the ilio-inguinal and the posterior femoral cutaneous nerve.

Forceps delivery is practically absent. If an episiotomy is necessary, it can be done quite easily even without any form of general anaesthetic. Sometimes, with the birth of the child, it is necessary to give light anaesthesia of nitrous oxide and oxygen.

The baby is born and usually cries spontaneously, having a good colour and being free from asphyxia. The episiotomy is then repaired with the patient absolutely conscious. This aids in the separation of the placenta and cuts down the amount of blood loss when the placenta is expelled; this expulsion is usually at the conclusion of the repair.

Incidence of post-partum hæmorrhage has decreased considerably with this procedure. This is also true of local or generalized puerperal sepsis. Our fetal deaths in toxic cases are steadily diminishing. We have concluded that this method is much safer than our older system which consisted of heavy sedation followed by a general anaesthetic of nitrous oxide and ether or even chloroform.

Group 2.—For many years, I have personally been interested in breech delivery. After observing different methods and their results, we decided that the conservative handling of this type of case was the best. In five years, our fetal mortality dropped from 19 to 11 per cent. This method depends on a fair amount of sedative (preferably heroin) in the first stage of labour but total abstinence during the second stage.

As the breech comes in sight, light general anæsthesia with nitrous oxide and oxygen is used. When the pains are excessively hard and the breech fills the vulvar ring, the injection of novocaine into the perineum aids considerably. Many breech cases are not actively aided in any way until the arms are delivered. If this procedure is carried out, difficulty with the after-coming head is rarely encountered.

Group 3.—I have purposely left this most important group to the last—Cæsarean section. The Cæsarean operation is very spectacular. Unfortunately, it is quite simple to perform and, hence, it is done far too often in order to satisfy the vanity of the individual doctor or to please the general public. But the damages may be great, both to mother and to baby. Throughout the United States and Canada, even in some Grade A hospitals, the maternal mortality goes as high as 4 per cent. There is also a fetal mortality which equals or even exceeds that found in cases delivered *per vaginam*.

In recent years, the indications for section have increased tremendously. Some of these indications are justifiable. We cannot adversely criticize operative delivery for placenta prævia, severe chronic cardiac cases, and for certain individuals with chronic nephritis.

TABLE I.
INDICATIONS

	General	Local
Contracted pelvis or elderly primipara	54	44
Placenta prævia	15	10
Toxæmia	8	16
Fibroids	4	3
Stenosis of cervix	2	1
Heart disease	0	4
T. B. C.	0	3

These last cases mentioned are never good operative risks from the standpoint of mother or baby. Here again general anæsthetic plays a part in the maternal outcome and most certainly in the fetal result. Spinal anæsthesia in Cæsarean section has not treated us kindly in the Royal Victoria Montreal Maternity. For these reasons, we have again turned to local anæsthesia in many of these operations. Our handling of the individual case is as follows: if possible, the night previous, nembutal gr. 1½; two and one-half hours before operation, heroin gr. 1/12; one and one-half hours before operation, heroin gr. 1/12. The patient is catheterized and prepared with as

little handling as possible. Novocaine 1 per cent with adrenalin minims 5 to every 150 c.c. of solution is used. The method of injection is skin infiltration and deep nerve block in three layers.

TABLE II.
CONSECUTIVE CÆSAREANS SINCE JULY, 1939
166 CASES

General anæsthetic	83
Local anæsthetic	83
Classical	106
Lower segment	45
Porro	15

TABLE III.
MORBIDITY (100.6° OR OVER) 55 PER CENT—92 CASES

Causes	General	Local
Intra-uterine infection	25	27
Peritonitis	12	2
Pneumonia	5	1
Phlebitis	3	3
Wound infection	4	5
Breast or pyelitis	0	5
Total	49	43

TABLE IV.
MORTALITY

MATERNAL (2 cases)	General	Local
1.2 per cent Sepsis	1	Hæmorrhage
FETAL (8 cases)		
4.8 per cent Atelectasis	1	Died before operation
		Congenital heart
		Spina bifida
		Atelectasis

The advantages of local anæsthesia regarding the mother are many. Due to normal uterine contraction with the patient conscious, the blood loss at operation is much less; also due to this same contraction, the uterine wound is much smaller and much less catgut is used to close this wound. Lung complications are less prone to occur. Post-operative vomiting or distension is conspicuous by its absence. Hence there is less tendency to the development of an ileus or even of a peritonitis.

There is less asphyxia in the baby. Only four of the eighty babies born alive, needed any active form of resuscitation. This is a direct contrast to the 83 babies born under general anæsthetic where 23 babies had one or more active forms of resuscitation.

The adverse results, other than the one maternal death, were few. Infected wounds were very slightly more frequent than where general anæsthesia was used. Two cases had fairly marked vascular reactions immediately

following operation, manifested by pallor and a thready pulse. They were relieved quickly by intravenous glucose and morphine. These two cases were both thought to be novocaine reactions. One other had a severe convulsion as the baby was being born. Cyclopropane anaesthetic only seemed to accentuate the twitchings. Sodium pentothal was then given intravenously with immediate good results. This patient confessed afterward to being an epileptic and stated that she thought this to be just another attack.

CONCLUSIONS

Local anaesthesia has a definite place in obstetrics.

The chief indications are: (a) In toxic cases especially where the baby is premature. (b) If a general anaesthetic is contraindicated or if a competent anaesthetist is not available. (c) to aid in the spontaneous expulsion of the breech. (d) In any Cæsarean section if the patient is suitable, but especially in those cases complicated by placenta prævia, severe cardiac disease, or by chronic nephritis.

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RÉSUMÉ

Les analgésiques et les sédatifs, en général, ont un effet désastreux sur la respiration des nouveau-nés. Celle-ci est retardée et le cerveau de l'enfant souffre indubitablement. Le degré d'asphyxie des nouveau-nés est proportionnel à la quantité du sédatif employé chez la mère. Certains cas pathologiques sont cependant justifiables de l'anesthésie locale: ce sont les cas toxiques avec naissance prématurée, les présentations du siège et les césariennes. Les mères "toxiques" bénéficient de petites doses graduées d'héroïne (1/24 gr.) et de novocaïne au niveau du périnée; un peu de protoxyde d'azote très dilué est supportable. La même méthode est utilisée pour les présentations du siège. Les césariennes peuvent se faire avec moins de risques pour la mère et l'enfant après préparation au nembutal et à l'héroïne et opération à l'anesthésie novocainique localisée. Quatre seulement des 80 bébés ainsi nés eurent besoin d'être ressuscités. Une seule mort maternelle fut enregistrée.

JEAN SAUCIER

THE USE OF VITAMIN P IN THE ŒDEMA OF PREGNANCY TOXÆMIA

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THE Œdema that characterizes most of the toxæmias of late pregnancy has been ascribed,¹ in part at least, to an increased capillary permeability. As citrin (vitamin P) has been credited with controlling the latter, it was thought that it might be useful in such Œdemas of pregnancy. Lajos² had reported its administration to five patients with hæmorrhagic nephritis, four of whom were Œdematous. He thought that both the nephritis and Œdema were benefited.

A group of sixteen pregnant women were chosen; they displayed gross Œdema of the extremities in association with a late toxæmia. No other cause for this Œdema was discernible. They were given citrin daily, beginning as soon as the Œdema appeared and continuing until delivery. The daily dose was 60 to 120 mg., given in the form of a solution made by suspending 10 grams of citrin in 500 c.c. of water. None of these women, it should be stated, had had any of the symptoms of vitamin P deficiency

mentioned by Scarborough.³ As controls, a pregnant cardiac patient with Œdema but without toxæmia, and a non-pregnant woman with hypertension and Œdema were added to the series. It soon became apparent that no further controls would be needed, for no effect that could be detected was produced in any of the 18 patients to whom the citrin was given. The weight curves of the pregnant patients continued to rise just as before and the other evidences of toxæmia were unaffected. Four other pregnant women with Œdema due to late toxæmia were then given 900 mg. of citrin per day. These also appeared to be unaffected by its administration.

SUMMARY

1. A preparation of citrin (vitamin P) was given to 20 Œdematous women in late pregnancy. The Œdema was ascribable to pregnancy toxæmia.
2. It was also given to a pregnant woman in late pregnancy showing cardiac Œdema and to a

non-pregnant woman having hypertension and oedema.

3. The visible oedema and weight were unaffected in all cases.

The writer desires to thank Dr. H. A. Cave and The Winthrop Company for liberal supplies of the citrin used in this work.

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3. SCARBOROUGH, H.: Deficiency of vitamin C and vitamin P in Man, *The Lancet*, 1940, 2: 644.

RÉSUMÉ

On a cru que la citrine (vitamine P) avait de bons effets sur les œdèmes de la grossesse. Cette croyance est erronée puisque chez 16 femmes enceintes présentant des œdèmes la citrine n'a eu aucun effet sur ceux-ci. Une femme enceinte cardiaque présentant de l'œdème de décompensation et une femme non-enceinte, hypertendue et œdémateuse ne bénéficièrent pas davantage de la citrine. JEAN SAUCIER

THE NATURAL HISTORY OF MIGRAINE*

BY JOHN W. SCOTT

University of Alberta, Edmonton

SOMEONE has divided headaches into three simple groups, viz., those that one can forget, those that one cannot forget, and those that make one forget everything else. The headache of migraine falls in the third group.

One writer claims that 7 per cent of the population suffer from this malady at some time in their lives. If this figure is correct almost ten million people on the North American continent are afflicted. Because of the common occurrence of migraine and the severe, if only temporary, disability which it causes one feels that it is a subject worthy of discussion. Inasmuch as nearly all the manifestations of migraine are subjective rather than objective in nature the subject lends itself to investigation by careful enquiry rather than by objective methods.

Our knowledge of the natural history of the disease or syndrome, whichever we please to call it, has been built up on case histories rather than on physical signs, morbid anatomical, or experimental investigation. The general practitioner with his intimate knowledge of the social and family background of his patients is in an admirable position to study the nature and treatment of the condition.

Except in the rare instances in which characteristic migraine has been associated with cerebral angiomatous tumours and congenital aneurysms of the circle of Willis no morbid anatomical changes are found in the central nervous system. The cerebrospinal fluid is normal.

Experimental observation has thrown some light on the possible mechanism involved in the production of the headache which is the major symptom in this condition. The intravenous injection of histamine gives rise to headache which is due to dilatation of the meningeal arteries. Such stretching of the arterial walls gives rise to headache mediated by branches of the trigeminal nerve. In migraine a similar dilatation of cranial arteries occurs. The relief obtained by the use of ergotamine tartrate is due to the action of this drug in causing vasoconstriction of the dilated arteries.

The clinical picture of migraine is too well known to require any detailed description. In the full-blown attack we recognize four cardinal features, viz., recurrent headache, visual disturbances, gastro-intestinal symptoms and a family history of the disease. The headache which is the most outstanding symptom occurs on a background of good health, as a rule. It is most often frontal, but may be orbital, temporal, vertical or occipital in situation. At the onset the headache is usually unilateral, as the term "migraine" suggests, but it often becomes bilateral, as it develops, or it may be diffuse from the onset. The headache is severe and usually associated with profound prostration.

The visual disturbances which constitute the aura of an attack are the well known scintillating scotomata, visual blurring or hemianopia. Other forms of aura have been described, such as dizziness, numbness, abdominal discomfort or even a feeling of unusual fitness.

* Read at the seventy-second Annual Meeting of the Canadian Medical Association, Winnipeg, June 26, 1941.

The aura usually precedes the onset of headache by a few hours.

The gastro-intestinal manifestations are persistent nausea and vomiting, sometimes abdominal discomfort, rarely, actual abdominal pain. The duration of these may vary from hours to days. Sometimes, but not always, the onset of vomiting gives relief from the headache.

A family history of periodic headache is present in 50 to 90 per cent of cases according to published figures.

The transmission of migraine is as a dominant Mendelian unit. In taking family histories of migrainous patients one is impressed by the fact that the mother rather than the father has recurrent headache. This is explained by the fact that migraine is two or three times more common in females than males.

The patient may show the complete syndrome with each attack, *i.e.*, aura, headache, nausea, vomiting and prostration. He may however show only a fraction of these with a similar pattern in each attack.

There are other interesting features in the natural history of this disease. The onset is usually in childhood or youth, with a tendency to disappearance after the 50 year mark. This tendency is greater in women and often occurs following the menopause. Actually, however, migraine may develop at any age, and one has occasionally seen the first evidence of it in the fifties. In childhood recurrent attacks of vomiting without headache may, for years, precede the fully developed syndrome.

Much has been written and little has been established as to the etiology of migraine. A characteristic migraine physique has been described in which we find vasomotor instability, moist extremities, transparent skin, with lowered resistance to fatigue and increased resistance to infection. One is not impressed by the physical so much as the mental constitution in migrainous patients. They are usually alert, intelligent people, often subject to fluctuations of mood, and usually are found in responsible positions in the world.

Such a happy hunting ground as etiology in migraine has attracted the allergists. They have suggested that migraine basically is an inherited allergic susceptibility with superimposed exciting causes. Every migrainous patient can tell us of one or more such exciting factors. Anxiety, excitement, fatigue, some

offending food, constipation, sexual factors, such as menstruation or coitus, eyestrain or oversleeping are commonly met with. Foods as agents in precipitating a migrainous attack are common enough and may account for much misery until the association is discovered. Common offenders are meats, chocolate, eggs and nuts. Impaired liver function and migraine have been closely associated in the literature without much to prove the validity of such a relationship in the patient. The migrainous patient often shows, either in himself or in his family tree, the earmarks of definitely recognized allergic states, such as hay fever, asthma or urticaria.

The emotional factor often is significant in exciting an attack, and it has been suggested that migraine is an imbalance between processes of excitation and discharge in the cerebral cortex.

The frequent occurrence of migraine with the menstrual period and its disappearance with the menopause strongly suggests an endocrine exciting factor. One observer has shown a decreased oestrin output in the migrainous woman with an upsetting of the normal prolactin oestrin ratio. The association of migraine and hypothyroidism has been described.

Epilepsy and migraine may alternate in the same patient. Since the latter is such a common ailment it is not likely that it occurs any more commonly in epileptic than in non-epileptic patients.

DIAGNOSIS

Diagnosis rarely presents any difficulties if the four cardinal features, aura, headache, nausea and vomiting, and family history are kept in mind. Brain neoplasm involving the optic radiations may give the visual symptoms of migraine. Periodicity would be much less likely to be present in neoplasm. Objective evidence of increased intracranial pressure in eye grounds or cerebrospinal fluid is not present in migraine.

The digestive symptoms of migraine have to be distinguished from those due to intra-abdominal disease. The absence of pain in the abdomen and the presence of pain in the head in migraine, together with the absence of abdominal tenderness and rigidity put us on the right track.

PROGNOSIS

This is a matter of vital interest to the patient. How long will the attacks last? Will they get worse? Will they react to treatment? Will they shorten my life?

We can say "No" without reservation in answer to the last question. Any attempt to answer the other three will be with much reservation, if the physician is wise.

In very general terms we can say that attacks beginning early in childhood or at the menopause do not react well to treatment. An occupation involving exacting brain work, eye-strain, or responsibility makes for a poor prognosis. Irregular dietetic habits such as are common in the physician and the travelling salesman are not good. Attacks associated with the menstrual period usually do well. It is not uncommon for the attacks to become more frequent and more severe in the fifties and then disappear.

TREATMENT

While we cannot claim any specific treatment in this baffling disease yet we may do much to make the patient's life more livable.

General measures in treatment should include a frank discussion of the nature of the condition with the patient. He should know of the association of the attacks and his "highgear" make-up. Mild sedation in the form of a small dose of bromides or phenobarbital given over a prolonged period often lessens the frequency and severity of the attacks. Regularity of living with a full quota of rest and sleep should be advised.

Avoidance of exciting factors.—Any offending food should be excluded from the diet. The search for it may not be easy. I have found skin tests to be of little value. A simple elimination diet with gradual additions often helps to run down the culprit.

Overwork, fatigue, excitement, argument, and emotional strain should be advised against. Unfortunately, the type of patient who presents himself with migraine is not very apt to follow such advice.

The correction of constipation, the adequate treatment of a peptic ulcer or any other cause of dyspepsia may ward off an attack. I can recall at least a half dozen cases in which the

correction of achlorhydria with dilute hydrochloric acid brought relief. Why? I do not know.

If the attacks of migraine are associated with the menstrual period the giving of oestrogenic substance for the two or three weeks preceding the expected flow is of definite value. The treatment of hypothyroidism, if present, with continued adequate doses of thyroid extract has justified itself.

Lastly—measures to relieve the attack have to be considered. Opium and its derivatives for obvious reasons must not be used. The sedative drugs which have been used are legion and I shall not even mention them. In 1926 a drug, ergotamine tartrate, was introduced which is an effective therapeutic agent. Ergotamine tartrate is not a sedative but it relieves the headache of migraine in 75 to 90 per cent of cases if given promptly by injection. We have already discussed its probable action in referring to the mechanism of migraine. The dose is 0.5 mg. intravenously or intramuscularly, given as early as possible. Much larger doses up to 5 mg. are required by mouth, and are much less effective. The patient should be instructed in the use of a hypodermic syringe and the method of intramuscular injection.

By the prompt intramuscular injection of a half milligram of ergotamine tartrate he may get relief from the headache within an hour and be saved many hours of misery and disability. One must keep in mind, however, that not all cases of migraine respond to this drug. Further, its use is contraindicated in septic states, in peripheral vascular and coronary artery disease, and in pregnancy.

SUMMARY

1. Migraine is an extremely common disease, baffling in its etiology, and without known organic basis.

2. The four cardinal features are recurrent headache, visual disturbances, gastro-intestinal symptoms, and a positive family history.

3. Treatment of migraine is largely symptomatic, yet the use of general measures, removal of known exciting factors, and the use of ergotamine tartrate in the attacks will do much to alleviate the condition.



Case Reports

PRIMARY TUBERCULOUS LESION SELF INFLICTED

By J. S. D. BURNES*

Winnipeg

During the course of an autopsy on May 15, 1941, at the Provincial Mental Hospital, Esson-dale, B.C., the needle I was using slipped, punctured my glove and entered the first knuckle of the ring finger of my left hand. Precautions were taken to prevent infection by painting the wound with tincture of iodine and by forcibly squeezing to continue bleeding for about five minutes. No further precautions were taken. There was no apparent immediate inflammation. Occupation was continued as usual.

On the night of June 11, 1941, a slight and very limited inflammation was noticed on the punctured finger at the approximate site of the entrance of the needle. The following day warm antiphlogistin thermofuge poultices were applied continuously with fresh poultices every six to eight hours. The inflammation progressed and necrosis of the affected area was noticed during the following week. The site remained slightly tender. It should be noted here that additional exposure had been experienced while working on the tuberculosis wards of the hospital. Soon after I first noticed the inflammation on my finger I looked up the report of the autopsy on which I had been working and was very disturbed to find that the patient had had advanced pulmonary tuberculosis. On July 2, 1941, a Vollmer tuberculin patch test was applied to the left forearm and in the prescribed 48 hours a very definite positive reaction was observed. A tuberculin test had been carried out six weeks previously, on May 23rd, and was reported as negative.

About June 20th, the left arm became stiff and axillary lymph glands on that side became very tender, hard, and painful on movement. Similarly the epitrochlear glands became slightly hardened and enlarged. The lymph glands remained sore for about 12 to 14 days, during which time they became more indurated. The

tenderness disappeared. Between July 29th and August 2nd, a period of mild indigestion was experienced, in which vomiting occurred twice daily on the first day and almost daily after that. Mild pleuritic pains, greatly magnified on deep inspiration, appeared on August 3rd for a week, and again from September 1st to 25th, when they were so severe as to call for strapping of the chest. The inflamed area increased in size to about 15 x 8 x 4 mm. with a central core rising to a head.

On July 5th a blood sedimentation was performed and the rate per hour was found to be 11.0 mm. with a maximum in 5 min. of 1.5 mm. Sedimentations were repeated on the following days, with the following results. July 8th, 10.5 mm.; July 21st, 3.4 mm.; August 5th, 5.2 mm.; August 8th, 5.0 mm.

The temperature varied between 98.2° and normal throughout the last three months, except for one day, August 24th, when uncomfortable pleuritic pains were felt and the temperature rose to 101.5°.

On July 23rd a white and differential blood count was done with the following results: white blood count, 5,200; differential count, polymorphonuclears, 68 per cent; large lymphocytes, 1 per cent; small lymphocytes, 26 per cent; monocytes, 4 per cent; eosinophiles, 1 per cent.

A blood Kahn test was negative on July 29, 1941.

A few days after I punctured my finger on May 23rd, a chest x-ray examination was performed, with negative results. Since that time, on July 5th, i.e., after my tuberculin test had turned positive; on July 23rd, and again on August 31, x-ray examinations were performed with similar negative plates.

Antiphlogistin poulticing was discontinued on July 25th, and x-ray treatment was begun on the finger lesion, on the axillary lymph glands and on the epitrochlear glands, on July 29, 1941. Small weekly treatments were administered at the rate of 100 r/air units weekly. On August 13th, the epitrochlear glands had disappeared. The axillary glands regressed in size.

About August 6th, the local area of inflammation came to a head. Wet lysol poultices

* Mr. Burnes is an undergraduate in his second year of medicine at Manitoba Medical College, Winnipeg.

were applied on August 11th and 12th, and on August 12th the lesion began to discharge a thick yellow exudate. A smear was made of this and stained for acid-fast bacilli. The smear was positive for tubercle bacilli, and had a Gaffky count of 8. Five treatments with ultraviolet rays were given, but no beneficial result was obtained.

At the present time (October) the lesion remains intermittently open and closed, with an exudate positive for tubercle bacilli when open.

From the evidence set forth it is concluded that the incubation period of tubercle bacilli in the human being is 28 days.

SUMMARY

1. Finger pricked May 15, 1941.
2. Tuberculin test negative May 23rd.
3. Local inflammation noticed June 11th.
4. Axillary glands tender June 20th.
5. Tuberculin positive on July 2nd.
6. Indigestion and vomiting July 29th to August 2nd.
7. Mild pleuritic pains August 3rd to 8th and August 24th to 29th.
8. X-ray examination of chest negative in May, July, August, and October.
9. Kahn negative July 29th.
10. X-ray treatment begun July 29th.
11. Lesion discharged on August 12th. Positive for tuberculosis—Gaffky 8.

I would like to express my thanks to Dr. U. P. Byrne for his medical advice and for placing the facilities of his laboratory at my disposal; to Dr. Ethlyn Trapp for her services as a radiologist, and to Dr. Wm. Trapp for his assistance in preparing this paper.

SLOWING OF THE PULSE IN ACUTE APPENDICITIS

By R. S. WOODSWORTH

Kimberley, B.C.

The following case is of interest, I think, from two viewpoints, *viz.*, (1) from the purely diagnostic standpoint, in that it presents a sign the reverse of that usually found in acute appendicitis; (2) it asks a question of the clinical pathologist: how and why does acute inflammation of the appendix in certain cases result in slowing of the pulse?

The patient, a miner, aged 29, was first seen at 11.00 a.m., July 14, 1941, complaining of abdominal pain. He stated that the pain had been present when he awoke the previous morning and that it had persisted since. He had not slept the previous night because of it. It began

in the epigastrium and later became generalized over most of the abdomen, being most severe in the region of the umbilicus. There was no radiation elsewhere. He vomited once that morning. He had taken no drugs except a small dose of a bismuth mixture a few hours previously. His bowels always moved regularly daily and moved today as usual. He had no urinary symptoms.

Past history.—He had had "an abscess around the right kidney" drained when about ten years old, and was in hospital about a month at that time. There were no apparent sequelae. In the same year he had a fracture in the region of the left wrist. He was in the Kimberley Hospital overnight in January, 1940, with a bruised foot. His pulse on admission at that time was 76; temperature 99°. The following morning his pulse was 88 (temperature 98°). He stated that otherwise he had always been healthy.

Examination.—The patient was a well-developed muscular young man, placid in type. Pupils equal in size, reacting to light and accommodation; tongue heavily coated; thyroid gland not palpable; pulse rate 45; temperature 97°. Lungs, negative. Heart, not enlarged; rhythm regular; no murmurs; rate 45. Abdomen, flat, moving fairly well with respiration. Marked tenderness in the right lower quadrant, especially over McBurney's point. Moderate rigidity of the right rectus. The right testicle was undescended and palpable in the groin.

No tenderness or palpable mass on rectal examination. The knee jerks equal and hyperactive. Extremities and spine negative.

While being questioned and examined the patient shifted restlessly from time to time, in obvious pain. On further examination, two hours later, and immediately following an enema and abdominal preparation, his pulse was 66 and temperature 98°. His blood pressure at this time was 125/80; leucocyte count 19,000; urinalysis negative.

Operation.—At 2.00 p.m. under ether anaesthesia the abdomen was opened. Through a Battle incision the appendix was found lying free in the general abdominal cavity; it was acutely inflamed, the proximal half swollen to the size of one's little finger. It was removed and the abdomen closed in the usual manner without drainage.

On examination of the interior of the appendix the whole of the mucosa was acutely inflamed and greatly thickened. Near the base was a ring of commencing gangrene. No obstructing body was found.

At the conclusion of the operation the pulse was 104; at 8.00 p.m. it was 106. The following morning it was 96. The patient made an uneventful recovery and was discharged on the tenth day. After the first three days his pulse ranged mostly between 66 and 84 though twice it dropped to 60 and once was recorded (on routine charting) as 56. He was seen four days after discharge when his pulse was 72.

COMMENT

The point I wish to make is that the slow pulse before operation was due to the attack of acute appendicitis; that it was not an habitually slow pulse is proved, I think, by the previous pulse record and by that subsequent to operation.

I also wish to stress the fact that at the time the patient was first seen he was suffering moderately severe pain, more pain than is experienced in most attacks of appendicitis. I have seen one very similar case of slowed pulse rate (published in the *Brit. M. J.* of January 29, 1939) in which the patient also complained of fairly severe pain during an unusually acute attack of appendicitis.

Clinical and Laboratory Notes

A METHOD FOR REMOVAL OF SUB-UNGUAL SPLINTERS

BY M. C. DINBERG

Ottawa

Physicians are called upon frequently to remove wood splinters from under finger nails. The ordinary difficulty of removal is often enhanced because the patient or another person has already attempted to remove the splinter, with the invariable result that it is broken off just below its grasping point at the free margin of the nail.

The usual methods of extraction of a splinter, probing with a fine pointed forceps or a needle, or splitting the nail, are extremely painful unless the finger has been well anaesthetized. There are usually several unsuccessful attempts to grasp and maintain a grip on the splinter; sometimes the splinter crumbles under the forceps. Each attempt results in increased

trauma to an already potentially infected nail bed.

The method described here has been used on many occasions. It avoids the need for local anaesthesia and is relatively painless.

After sterilization of the finger tip, a Ralk nail drill with sterile bit or a similar device, is placed immediately over the splinter in its proximal third. A small hole is drilled directly downward to the splinter. Once completely through the nail, a sterile hypodermic needle can be inserted so that its sharp point bears into the splinter. The needle can then push the splinter forward sufficiently so that it may be grasped by forceps at the free margin of the nail. Antiseptic solution is introduced under the nail through the opening and an ordinary finger dressing is applied.

This method offers a clean, rapid, non-traumatizing removal of sub-ungual splinters. In addition, the hole in the nail acts as added drainage should the splinter have carried infected material under the nail.

Editorials

THE EFFICIENCY OF INDUSTRIAL WORKERS

IN our issue of September we took occasion to deal editorially with the topic of Industry, Medicine, and the War. This subject is of much importance at the present time and has such wide implications that we make no apology for returning to it. At that time we dealt with certain principles which seemed to cover the situation, but, in particular, with the rôle which medical practitioners might play in the general scheme, and advocating the formation of a Central Co-ordinating Committee to give a lead, to establish order, and with power to enforce its decisions. At the present time we seem to be at loose ends. The experience of the last Great War taught us much, but some of the conclusions reached have slipped our memories, and despite much research in the intervening years we have not in the present emergency assimilated and put into full practice the knowledge available. There are no doubt reasons for this, but we might do better. We should make conditions such that the best in everyone will be brought out. It is obvious that the best soldiers will be

of little use if not supplied sufficiently with food, clothing, protection, and munitions of war. It is here that the operative comes in, and it is the conditions which make his work more effective that we wish to consider now.

To get the best results co-operation between all the parties concerned is imperative—the Government, the manufacturers, the miners, operatives of all kinds, the medical profession—all of us. Co-operation is the key-word.

Co-operation means good will on all sides and a disposition to turn out the best possible quality of work and as much of it as possible. Early in the war the trades unions of Great Britain patriotically decided to bar all strikes for the duration. Compare this with what has been going on in certain other countries we could name! Just as bad or worse is a conspiracy to limit production. In such occurrences it is easy to identify what really amounts to a Fifth Element in the Axis. This brings us to another point. The maximum output in

any industry, and particularly in War Work depends in large measure on the constant and speedy supply of the materials for the production of the particular product being turned out, and not less on the quality of the human element. We have read recently of cases where in certain factories in Britain women have worked several days without a change of clothing, foregoing a week-end rest and working hours overtime, and where a man has been known to drop fainting at his machine. All this is highly creditable to the spirit of the workers, but cannot be regarded as contributing to efficiency. Many examples are available to show the harmful effect of fatigue on industrial efficiency, taken from a number of spheres of endeavour. One may be cited, taken from a highly technical field, which will serve to emphasize the point. A classical instance of the effect of overtime hours was observed¹ at the Zeiss Optical Works, Jena. When the operatives were on a 9-hour day they were occasionally required to work one hour of overtime in seasons of pressure. The overtime was imposed one November. The extra output deteriorated after a week, and by the third and fourth week, was practically non-existent, although the men were eager to earn extra money for Christmas. Indeed, for years past the human factor has not been overlooked entirely. There was so much illness and lost efficiency among munition workers during the last Great War, that the successful issue of the struggle was jeopardized. Accordingly Mr. Lloyd George, then Minister of Munitions, in 1915 appointed a Health of Munitions Workers Committee "To consider and advise on questions of industrial fatigue, hours of labour, and other matters affecting the physical health and physical efficiency of workers in munition factories and work shops." The members of this committee included representatives of the Factory Department of the Home Office, the Medical Research Committee (late Council) of Employers, Labour and other interests. It is beyond question that the efforts of this Committee gave a striking impetus to the scientific study of the human element in industry.

The movement initiated by the Ministry of Munitions was continued by the establishment in 1918 at the hands of Mr. R. R. Hyde, of a voluntary organization devoted to the welfare of boys and called the Boys' Welfare Association. A year later, at the suggestion of H.M. Queen Mary, the organization was extended to cover all workers in industry, and The Industrial Welfare Society was founded with Mr. Hyde as director.

The results obtained by the Health of Munitions Workers Committee, though limited to war conditions, were thought to be so valuable that the investigation should be extended to take in industries in general under peace-time conditions. To this end the Medical Research Committee and the Department of Scientific and Industrial Research formed a Committee to investigate the subject of industrial fatigue on more comprehensive lines. An Imperial Fatigue Research Board was appointed in July, 1918, "to consider and investigate the relations of the hours of labour and other conditions of employment, including methods of work, to the production of fatigue, having regard both to industrial efficiency and to the preservation of health among the workers." From 1921 onwards this Board became a branch of the Medical Research Council with the following modified terms of Reference, "To advise upon or carry out schemes of research . . . undertaken to promote better knowledge of the relation of hours of labour and other conditions of employment, including methods of work, to functions of the human body, having regard both to the preservation of health among the workers and to industrial efficiency; and to take steps to secure the co-operation of industries in the fullest practical application of the results of this research work to the needs of industry." In 1929, for the reason that the Board felt that its work was becoming less concerned with eliminating unfavourable conditions than with promoting favourable ones, it became known as The Industrial Health Research Board. Through the efforts of these organizations, composed of experts, a considerable mass of factual information has been built up which has already been useful and should certainly prove useful in

1. ABBE, E.: *Gesammelte Abhandlungen*, 1906, 3: 1906.

emergencies such as the present war. Such subjects as Hours of Work, Work Spells, Rest Pauses, Shift Systems, Sickness and Absenteeism, Accidents and Injuries, The Ventilation, Heating and Lighting of Factories, Welfare and Labour Management. Much of this can be found in Governmental Reports, which are not quickly available to the Canadian authorities, but can be obtained by a perusal of an excellent little book by Dr. H. M.

Vernon,² who himself did fine service in the cause. The marrow of what has been done in these directions since the last war can be found in this work, logically treated and well systematized. The whole subject has been well covered.

A.G.N.

2. *The Health and Efficiency of Munition Workers*, H. M. Vernon, M.A., M.D., McAinsh, Toronto, 1941, \$2.50.

MORE MAN POWER

A YOUNG man of twenty-two should be a perfect physical specimen if he ever hopes to be one. He has passed his majority and has attained his growth. It is true that he has some distance to go before he is fully matured but so far as his body is concerned, he should be at about his best. One could not help but make such an observation when studying the statistics published in the October *Journal* relating to the medical examination of 50,000 youths (average age 22.5 years) called up for military training.

Were these young men all perfectly fit? The answer is decidedly "no". Take another look at the statistics and ponder their meaning. Forty per cent of the total number had disabilities which removed them from Class A men. Thirteen per cent were found to be absolutely unfit for any military service. Think of it—6,500 young men out of a group of 50,000, so disabled from one cause or another that they had to be discarded as useless and worthless to Canada's military strength. This whole story is a sad commentary on our civilization and our progress.

Science has long since demonstrated that by prevention and treatment marvellous results can be achieved with human lives. Proper nutrition will make strong bones and muscles. Eradication of focal infections in mouth and nose and ears will prevent many diseases developing to produce disabling effects. Operative procedures, many of them simple when performed early, will correct hernias and deformities. Eyes carefully examined and assisted where necessary by proper glasses will be made to function satisfactorily. And, to go back still further,

striking evidence has been produced to show that expectant mothers, adequately fed and cared for, will produce healthy children whose chances of proceeding to healthy maturity are greatly enhanced by proper prenatal care. All these things we know. What are we doing about it? In our opinion there are several distinct and clear-cut challenges which should be met.

In the first place, a review of the statistics would confirm the belief that several battalions of front-line soldiers can be reclaimed from the 40 per cent who were found to be unfit. How? Proper medical attention is the answer.

Bring these young men into hospitals. Let each one be carefully and thoroughly examined, having in mind the application of remedial treatment. Put glasses on those who need them. Clean up focal infection of teeth and mouth and nose and ears. Prescribe proper and adequate foods for those who are undernourished. Operate on those whose hernias or other defects may be put right.

Canada needs man power for war and war industry. Canada should gladly stand the cost of making several thousand young men who find themselves inferior in physical fitness, into first Class A1 men. What will it cost? Perhaps a few hundred thousand dollars—a fraction of a day's war expenditure. But it will be money as wisely spent as any dollars voted by our Government to the prosecution of the world's struggle. The Government should undertake this program without delay. The medical profession can be counted upon to co-operate wholeheartedly. Will it be done?

What else should be done?

Canada's health machinery, and that includes every doctor and every nurse and every father and mother, should be focussed on a nation-wide effort to raise the standard of health of every citizen of our land.

It is a public disgrace to our age to find

so many of our youths numbered amongst the unfit. If the war serves as a medium to awaken us to do something to raise health standards in Canada, it will at least have served us well in one respect.

T. C. ROUTLEY.

Editorial Comments

Medical and Surgical Equipment Needed for British Hospitals

Some time ago the Red Cross sent out an appeal to the Canadian profession through the intermediation of the Canadian Medical Association, for old and discarded medical and surgical instruments—not so old, however, that they would find a more appropriate resting-place in some antiquarian museum! They should, of course, be serviceable. The response has been fair, but could be improved upon. The need is still great. Our genial chivalrous adversaries, the Nazis, seem to have evinced a predilection for the bombing of hospitals. Hospitals are expensive and their inmates helpless! Equipment has been destroyed in large quantities. New hospitals of all descriptions have had to be established. This takes time and money. We feel that it is only necessary to restate the situation to arouse anew the sympathetic interest of our medical colleagues, always responsive to the needs of the distressed. Witness the establishment recently of a Canadian Medical Association Fund in support of the War Benevolent Fund of the British Medical Association. The appeal of the Red Cross will not fall on deaf ears.

Many men, now out of practice, will have instruments that they can very well spare. Yet they can be useful. Also, executors of medical men's estates may, on occasion, have on their hands instruments which they are at a loss to dispose of. Here is an opportunity. Second-hand instruments, as we all know, have no market value.

All such material should be sent to the Canadian Red Cross Society, 95 Wellesley Street, Toronto, Ont., labelled "Medical Equipment for Britain". A Committee has been set up under the Chairmanship of Dr. E. A. McCulloch, of Toronto, which will examine every item, classify it, and recommend the necessary repairs. This committee wishes to be kept fully occupied. We believe it will be.

A.G.N.

The Jasper Meeting, June 15 to 19, 1942

The Central Program Committee is now engaged in preparing the program for the annual meeting. Any member of the Association who wishes to present a paper is invited to forward the title with a short abstract to the General Secretary, 184 College Street, Toronto, not later than January 31, 1942.

Pasteurization of Milk in Canada

The history of pasteurization of milk in Canada shows an encouraging growth of the application of sound principles and carefully acquired knowledge, but there is much still to be done before universal and uniform control of milk supplies throughout the Dominion is established. So far as one Province at least is concerned, however, such an ideal state has been brought within reasonable hope of attainment. This has resulted from the now well known Provincial legislation in 1938, by which milk pasteurization was made compulsory throughout the Province of Ontario. Up to that time the enforcement of pasteurization had been left largely in the hands of local municipalities, with authority to supervise milk production and distribution, but with the new regulations the Province has assumed a much wider activity, whilst still leaving the municipalities with some responsibility. The outstanding consequence of this legislation, which actually is an amendment to the Public Health Act rather than a special measure, is that pasteurization has been made compulsory in all cities and towns in Ontario irrespective of the population. Smaller communities have been gradually taken under the Act by special orders in council, and rural areas have also been designated. Special provision is also made for summer resorts with their large transient population.

The net result of this gradual tightening of control is that over 98 per cent of all milk sold

emergencies such as the present war. Such subjects as Hours of Work, Work Spells, Rest Pauses, Shift Systems, Sickness and Absenteeism, Accidents and Injuries, The Ventilation, Heating and Lighting of Factories, Welfare and Labour Management. Much of this can be found in Governmental Reports, which are not quickly available to the Canadian authorities, but can be obtained by a perusal of an excellent little book by Dr. H. M.

Vernon,² who himself did fine service in the cause. The marrow of what has been done in these directions since the last war can be found in this work, logically treated and well systematized. The whole subject has been well covered.

A.G.N.

2. *The Health and Efficiency of Munition Workers*, H. M. Vernon, M.A., M.D., McAinsh, Toronto, 1941, \$2.50.

MORE MAN POWER

A YOUNG man of twenty-two should be a perfect physical specimen if he ever hopes to be one. He has passed his majority and has attained his growth. It is true that he has some distance to go before he is fully matured but so far as his body is concerned, he should be at about his best. One could not help but make such an observation when studying the statistics published in the October *Journal* relating to the medical examination of 50,000 youths (average age 22.5 years) called up for military training.

Were these young men all perfectly fit? The answer is decidedly "no". Take another look at the statistics and ponder their meaning. Forty per cent of the total number had disabilities which removed them from Class A men. Thirteen per cent were found to be absolutely unfit for any military service. Think of it—6,500 young men out of a group of 50,000, so disabled from one cause or another that they had to be discarded as useless and worthless to Canada's military strength. This whole story is a sad commentary on our civilization and our progress.

Science has long since demonstrated that by prevention and treatment marvellous results can be achieved with human lives. Proper nutrition will make strong bones and muscles. Eradication of focal infections in mouth and nose and ears will prevent many diseases developing to produce disabling effects. Operative procedures, many of them simple when performed early, will correct hernias and deformities. Eyes carefully examined and assisted where necessary by proper glasses will be made to function satisfactorily. And, to go back still further,

striking evidence has been produced to show that expectant mothers, adequately fed and cared for, will produce healthy children whose chances of proceeding to healthy maturity are greatly enhanced by proper prenatal care. All these things we know. What are we doing about it? In our opinion there are several distinct and clear-cut challenges which should be met.

In the first place, a review of the statistics would confirm the belief that several battalions of front-line soldiers can be reclaimed from the 40 per cent who were found to be unfit. How? Proper medical attention is the answer.

Bring these young men into hospitals. Let each one be carefully and thoroughly examined, having in mind the application of remedial treatment. Put glasses on those who need them. Clean up focal infection of teeth and mouth and nose and ears. Prescribe proper and adequate foods for those who are undernourished. Operate on those whose hernias or other defects may be put right.

Canada needs man power for war and war industry. Canada should gladly stand the cost of making several thousand young men who find themselves inferior in physical fitness, into first Class A1 men. What will it cost? Perhaps a few hundred thousand dollars—a fraction of a day's war expenditure. But it will be money as wisely spent as any dollars voted by our Government to the prosecution of the world's struggle. The Government should undertake this program without delay. The medical profession can be counted upon to co-operate wholeheartedly. Will it be done?

What else should be done?

Canada's health machinery, and that includes every doctor and every nurse and every father and mother, should be focussed on a nation-wide effort to raise the standard of health of every citizen of our land.

It is a public disgrace to our age to find

so many of our youths numbered amongst the unfit. If the war serves as a medium to awaken us to do something to raise health standards in Canada, it will at least have served us well in one respect.

T. C. ROUTLEY.

Editorial Comments

Medical and Surgical Equipment Needed for British Hospitals

Some time ago the Red Cross sent out an appeal to the Canadian profession through the intermediation of the Canadian Medical Association, for old and discarded medical and surgical instruments—not so old, however, that they would find a more appropriate resting-place in some antiquarian museum! They should, of course, be serviceable. The response has been fair, but could be improved upon. The need is still great. Our genial chivalrous adversaries, the Nazis, seem to have evinced a predilection for the bombing of hospitals. Hospitals are expensive and their inmates helpless! Equipment has been destroyed in large quantities. New hospitals of all descriptions have had to be established. This takes time and money. We feel that it is only necessary to restate the situation to arouse anew the sympathetic interest of our medical colleagues, always responsive to the needs of the distressed. Witness the establishment recently of a Canadian Medical Association Fund in support of the War Benevolent Fund of the British Medical Association. The appeal of the Red Cross will not fall on deaf ears.

Many men, now out of practice, will have instruments that they can very well spare. Yet they can be useful. Also, executors of medical men's estates may, on occasion, have on their hands instruments which they are at a loss to dispose of. Here is an opportunity. Second-hand instruments, as we all know, have no market value.

All such material should be sent to the Canadian Red Cross Society, 95 Wellesley Street, Toronto, Ont., labelled "Medical Equipment for Britain". A Committee has been set up under the Chairmanship of Dr. E. A. McCulloch, of Toronto, which will examine every item, classify it, and recommend the necessary repairs. This committee wishes to be kept fully occupied. We believe it will be.

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The net result of this gradual tightening of control is that over 98 per cent of all milk sold

in Ontario for consumption in fluid form is pasteurized.

This legislation has had two other results of importance from the public health point of view. Whilst still leaving the municipality with definite responsibility in the matter of milk control, it has removed from it the necessity for having to decide for or against pasteurization, a decision not always easily made by bodies not trained in public health matters. Secondly, it has created uniform requirements for all pasteurizing plants in the Province, together with their supervision by the Provincial Department of Health, an essential provision in any effective milk control program.

There is no other Province in Canada with compulsory pasteurization on such a scale. It is probable that it is the first electoral area of its size anywhere to introduce such measures. A few cities of the Dominion have compulsory pasteurization. In the Province of Quebec St. Lambert has the proud distinction of being the first municipality in the Province to introduce it. Montreal has it, with a small percentage of special raw milk allowed. Many cities and communities of course have pasteurization in varying degree.

There is no longer any need to defend pasteurization as one of our most valuable public

health protective measures. Nor is it necessary to insist on the fact that it does not impair the nutritive value of milk. We feel rather that emphasis should be laid on the need to bring about a much wider application of it in our Dominion. This purpose has been greatly aided by what has been accomplished in the Province of Ontario.

H.E.M.

Dr. Jabez H. Elliott

It is with great pleasure that we note the recent honour conferred on Dr. Jabez H. Elliott, in his election as President of the American Association of the History of Medicine. This is an entirely appropriate recognition of one who fills so large a place in the sphere of historical medicine on this continent. It is probably safe to say that no other Canadian is known so widely, both in North America and in Europe, for his untiring interest in the historical aspect of medicine. Until international assemblies became impossible, Dr. Elliott could be unfailingly counted on as a representative of our profession at them, and he always brought back vivid accounts of the proceedings.

It is this assiduity and continual stimulation of interest in so precious an element of our profession that marks out Dr. Elliott as a leading spirit in this field.

H.E.M.

Men and Books

AMBROISE PARÉ*

By J. A. GUNN

Winnipeg

It seems a pity that the good example of Ambroise Paré is almost forgotten. So wrote Stephen Paget many years ago. With this in mind it may seem not inappropriate to renew our acquaintance with one of the greatest old masters of the surgical art, who is known as "the father of modern surgery", and one whose fame as a human benefactor will last until the race is no more.

Although not a military surgeon in the strict sense of the term, for in his day the French Army had no organized medical service, few men can have seen more of war and probably no surgeon has ever had more to do with wounds received in battle. He was surgeon to four kings, and during a period of thirty-two years accompanied the armies of France on most of their campaigns.

Paré was a prolific writer, and from these writings one can conjure up a fairly clear portrait of the man himself. He was one who enjoyed life immensely. He seems to have been extremely happy in his work and in his family life. He loved his country, his home, and his profession. He must have had a sound constitution and a good physique to have lived to the ripe old age which was his good fortune, in spite of the rigours of a huge practice and a very active life in other ways. He was not spoiled by success, nor by the change in his social conditions which success brought to him. He had a certain pleasing vanity which permitted him to praise without offence his own performances, and to chronicle with proper pride his own words. He had confidence in himself, but with it all he remained steadily compassionate, humble and sincerely pious. Who has not heard: "I dressed him, and God cured him"? This, and many similar expressions, given with transparent sincerity, vouch for the genuineness of his religious beliefs.

In order to fix in your minds the period in which Paré lived, I need only remind you that he was a young man just beginning to practise

* Read at the Seventy-second Annual Meeting of the Canadian Medical Association, Winnipeg, Section of Historical Medicine, June 25, 1941.

when Jacques Cartier was exploring the St. Lawrence. The date of his birth is somewhat uncertain, but it was between the years 1509 and 1517. He was born at Laval, of parents not in easy circumstances, and was therefore denied the privilege of a university education and a knowledge of Latin, the only language at that time in the books and schools of medicine. "I desire," he writes, "not to arrogate to myself that I have read Galen either in Greek or in Latin, for it did not please God to be so gracious to my youth that it should be instructed either in the one tongue or in the other."

Ambroise was apprenticed to a barber-surgeon, whose identity is unknown. The life of an apprentice in those days was a hard one if we are to believe a contemporary account.

"The cock has scarce done crowing when the apprentice must rise to sweep and throw open the shop, lest he lose the least payment that the tricks of the trade may bring him—some early beard to be shaved. He must comb the wigs, hang about the parlour or the staircase selling his stock, put folks' hair in curl papers, cut it or singe it. . . . Never did anyone ask so much of servant, never in the Islands did a white man seek so greedily to get profit out of a black one, as a master barber-surgeon tries to make gain out of the bread and water he gives his apprentices."

So hard at work were these apprentices kept, that "out of kindness" the professors gave their lectures to them at four o'clock in the morning.

After his apprenticeship the desire for improvement led him to Paris about the year 1532. In 1505 the Paris Faculty had taken the barber-surgeons under its wing, in order to spite the surgeons proper, of whom it was jealous, and a few years later these "surgeons of the long robe" as they were called, having failed to become a separate faculty, decided to make the best of a bad bargain by coming under the sway of the physicians. Hence, when Paré came to Paris the medical profession of that city was sharply divided into three classes. First came the physicians, members of the *Faculté de Médecine*, who held their heads very high. They arrogated to themselves the right of control over all who attempted to practise the healing art in any of its branches. The second class was composed of the surgeons, incorporated in the *Confrérie de Saint Côme*, and ordinarily termed surgeons of the long robe because of the garment they were authorized to wear. The community of the barber-surgeons held third place. The surgeons were thus ground between the upper and nether millstones, the physicians constantly checking them in any attempt to practise medicine and the barber-surgeons frequently encroaching on the field of surgical practice. The surgeons of the long robe would not condescend to operate. They confined themselves to the treatment of

surgical conditions by the applications of plasters and ointments, the use of the cautery and the treatment of wounds and abscesses. The barber-surgeons practised venesection, cupping and leeching, and were constantly extending their field by attempting operations, dressing wounds etc. There were several groups of empirical practitioners who did much real surgery. Thus the "incisors" cut for stone and operated for hernia. They were tolerated rather than authorized to practise. In many instances they were very skilful as well as daring. Others in this group operated for cataract. The treatment of fractures and dislocations was largely in the hands of the "rabouteurs" or bonesetters. All these empirics were peripatetics, wandering from city to city, generally having to leave each place after a time because of the jealousy excited in the regular faculty by their skill.

While the Faculty of Medicine and the surgeons translated the works of the ancients into French and published them so that they might be available to the barber-surgeons, men unlearned in Latin and Greek, any new works were published in Latin. Notwithstanding this handicap to the acquisition of knowledge the barber-surgeons were almost the only practitioners doing real surgery in Paris except the unauthorized empirics. They were prosectors to the anatomical lecturers of the Faculty, thereby acquiring some practical knowledge of anatomy, which they used in dressing wounds and fractures, practising bleeding and performing many operations while the surgeons, not deigning to actually dissect the body, and standing aloof from all surgical procedures except the application of plasters and ointments, had developed into a set of useless drones who hindered the progress of real surgical science.

Paré soon became resident surgeon in the Hotel Dieu and remained there for three years. He counted this among his highest honours. It may be presumed, therefore, that the position entailed important duties and that the appointment was by no means a common right or an ordinary favour. "Be it known", he says in his Preface, "that for the space of three years I resided at the Hotel Dieu of Paris, where I had an opportunity to see and know (owing to the great diversity of patients going there) everything that concerns operations or diseases pertaining to the human body; and, besides, I learned there, on an infinite number of bodies, all that can be said and considered on anatomy; also, that often I made very satisfactory proofs of it, and that very publicly, in Paris at the schools of medicine." And in his Apology, when a physician of Milan seemed surprised at the young man's knowledge, he proudly remarked: "But the good man did not know that I had been house-surgeon for three years at the Hotel Dieu of Paris."

Shortly after leaving the hospital Paré went

on his first campaign and thus began the work which before long established his reputation as the greatest military surgeon of his day. It was on this campaign that occurred the incident which illustrates his readiness to cast aside old traditions and profit by his own observations. The story is well-known, but it will bear repeating. All the authorities previous to this had taught that gunshot wounds were poisoned, envenomed by the powder, and that in order to counteract the poison they should be treated with boiling oil. After a bloody battle Paré dressed the wounded in the accepted fashion but owing to the great number to be dressed, to quote his own words,

"at length my oil lacked and I was constrained to apply in its place a digestive made of yolks of eggs, oil of roses and turpentine. That night I could not sleep at my ease, fearing that by lack of cauterization I would find the wounded upon whom I had not used the said oil dead from the poison. I raised myself very early to visit them, when beyond my hope I found those to whom I had applied the digestive medicament feeling but little pain, their wounds neither swollen nor inflamed, and having slept through the night. The others to whom I had applied the boiling oil were feverish, with much pain and swelling about their wounds. Then I determined never again to burn thus so cruelly the poor wounded by arquebuses."

This incident was the foundation of probably his greatest contribution to surgery, but he had many other claims to fame. He made amputation what it is today by reintroducing the ligature which had practically fallen into disuse since the time of Celsus. Heretofore an elaborate set of cauteries had been an essential part of every surgeon's armamentarium. He was the first to popularize the use of the truss in hernia; he did away with the strolling surgeons' trick of castrating the patient in herniotomy; he introduced artificial limbs and also artificial eyes; and he was the first to excise the elbow joint. He described fracture of the neck of the femur and he was the first to suggest syphilis as the cause of aneurysm. Medical men at least will appreciate the importance of these contributions to the advancement of surgery.

His reintroduction of the ligature was severely criticized by his contemporaries and fortunately for posterity these criticisms prompted Paré to write his "Apology and Journeys", a delightfully readable volume which throws many sidelights on his life and character, as well as on army life at that time.

A curious light on the life of the soldier of the time is given in Paré's narrative of his first campaign. Seeking a stable in which to put the horses of his man and himself, he came upon the bodies of four dead and three wounded soldiers lying against a wall. The wounded were terribly disfigured and unconscious. An old soldier came up, and regarding them with pity asked Paré if there was any-

thing he could do for them. On Paré's replying in the negative the soldier proceeded to cut their throats "doucement et sans colère". On Paré's remonstrating with him the old soldier replied that he prayed to God if he were ever in a similar case he would find someone to do the same for him rather than that he should languish miserably.

Probably no war wounds of that day could be worse than the shell wounds in modern warfare, but when one considers the disadvantage under which Paré and his contemporaries worked, contrasted with the surgical equipment of a modern army, one can realize that his lot was no sinecure. In addition to superstition, ignorance, sorcery, black magic, etc., he had to contend with a dismal lack of knowledge of anatomy, physiology, and pathology as we know them today. Wounds almost invariably became horribly infected, with the result that amputations were universally done in cases where today such a procedure would be entirely unnecessary. The following is a short list of the ordnance used to keep the surgeon busy. "There we found", says Ambroise, in his "Apology and Treatise", "everyone in arms, tocsin sounding from all sides, yea, for five or six leagues about the harbors, to wit, Brest, Couquet, Crozon, le Fou, Doulae, Launenac, each well-furnished with artillery such as cannon, demi-cannon, bastards, possevolants, field-pieces, culverines, serpentines, basilisks, sakers, falcons, falconneaux, flutes, organs, arquebuses a croc. . . ." Add to this imposing arsenal such toys as halberds, pikes, axes, javelins, swords, daggers, clubs, bars of iron, chains, grenades, lances, torches, fuses, melted lead, and quick-lime (to put out eyes) and it is small wonder that the good Paré frequently had his ingenuity tested to the point of entirely novel therapeutic measures.

In answering his critics Paré begins his Apology as follows:—

"Truly I have not put my hand to the pen to write in such a manner had it not been that some have impudently taxed and insulted me, and disgraced me, more by particular hate than by any good zeal they should have to the public, concerning my manner of tying veins and arteries. But now I wish to prove by authority, reason and experience that the said veins and arteries should be tied."

He then goes on to show that Hippocrates, Galen, Celsus and many others had advised the use of the ligature.

After citing a number of cases in which he had successfully used the ligature and at the same time inflicted much less pain on the patient than would have been done by the use of the cautery he closes the argument with: "He who doth strive against experience is not worthy of discourse of high science."

Paré, originally a barber-surgeon, was created a master surgeon by royal favour and

against the will of the Faculté. This, no doubt, increased the jealousy of the other surgeons, who did not view his rise to fame with magnanimity. Consequently, when Paré was about to publish in 1575 the first edition of his collected works, the Faculté launched a violent attack against the publication of the works of this upstart, who, they claimed, had so well feathered his nest by the most obvious breaches of propriety. However, it was published and enjoyed a wide circulation. It was the first real surgical treatise that had appeared since that of Guy de Chauliac over two hundred years previously, and it opened a new era of surgery by revealing to the surgical world the value of personal experience combined with a knowledge of the science of surgery as contrasted with the slavish submission to traditional dogma which had hitherto prevailed. He did for surgery what his great contemporary, Vesalius, did for anatomy, and what, intermixed with lamentable charlatanry, his other contemporary, Paracelsus, strove to do for medicine.

This great work was translated into English in 1634, and concerning this translation Sir D'Arcy Power has written:

"Johnson's translation of the works of that famous Chirurgion, Ambroise Paré, out of Latin, and compared diligently with the French, made the book a working guide for English surgeons from the appearance of the first edition in 1634 until at least the end of the century. The surgeons of this country took it at once to their hearts and quoted freely from it in season and out of season, for Johnson had made it speak in such homely English that it is difficult when reading it to think that it is merely a translation."

Paré did not confine his writing to purely surgical subjects. In 1568 he published a set of works on plague, small-pox and measles and a few years later his famous book dealing with Monsters, Terrestrial and Marine. In his day unicorn's horn was extremely costly since it was considered an absolute preventative against poisoning, a piece of it dipped into any decoction rendering the drink harmless. Paré cast a bombshell into the camp of the entire medical fraternity when he declared that there was no proof that such an animal ever existed and if such did, the horn was of no value. An anonymous critic advised Paré to confine himself to surgery, as when he goes beyond his confines the little children mock him.

Although his surgical training was gained almost entirely in camps he was able to adjust his teaching to the requirements of surgeons in civil practice and he himself enjoyed an immense private practice. He was medical adviser and counsellor to four successive Kings of France and among his other famous patients might be mentioned Catherine de Medici; the Queen of Navarre, Diane de Poitiers; Admiral Coligny, the celebrated naval general and Huguenot leader; Rabelais, monk, doctor, and humorist; Montaigne the philosopher; Mont-

morenci, the soldier; the entire family of the Guises; and a host of others. Truly a magnificent calling list.

Although far in advance of his time in most respects he could not entirely free himself from some of the superstitions of his day. He himself relates how he relentlessly pursued and pestered another surgeon who was purported to have an excellent ointment for the treatment of wounds. "At last," he states, "by gifts and presents he gave it to me, which was to boil in oil of lilies, little puppies just born, with earthworms prepared with Venetian turpentine. Then I was joyful and my heart made glad, to have understood his remedy, which was like to that which I had obtained by chance. See how I learned to treat wounds made by gunshot, not from books."

Another link with the past is shown by his statement that cataract should be operated on only at the waning of the moon.

Paré lived to a ripe old age and maintained his pre-eminence to the last. The words of L'Estoile, quoted by Packard, are a fitting epitaph:—

"Thursday, twentieth of December, 1590, the eve of Saint Thomas, died at Paris, in his own house, Master Ambroise Paré, surgeon to the king, aged eighty years, a learned man and the chief of his art; who, in spite of the times, had always talked and talked freely for peace and for the good of the people, that which made him as much loved by the good as he was wished evil and hated by the wicked."

Medical Relief Fund for Great Britain

British Columbia Still in the Lead

A further contribution has been received from British Columbia, amounting to \$1,147.50.

In the covering letter accompanying this, the Chairman of the local War Relief Fund, Dr. J. H. MacDermot, writes as follows:

"You may be interested to know that we found the method of appointing key men in certain districts, who in turn approached their friends, very successful, and the response was most satisfactory. We understand that in some districts the men formed clubs, and sent in a cheque covering their combined contributions. We hope to make use of this experience early in the year when we intend to organize another drive for contributions."

We wish to draw attention to the fact that all contributions to this Fund can be deducted from net taxable income in making up income tax returns. The official receipt will bear a notation to this effect.

Association Notes

Our Membership

A statement of our present membership is given below. It is earnestly hoped that all members will study this carefully. Here are some of the points on which comment may be made.

Three Divisions have shown a gain.

Five Divisions have shown a loss.

We are carrying 433 members in military service without fee—an increase of 246 over the previous year—and this figure will undoubtedly increase while the war continues.

There are 5,000 Doctors in Canada who do not belong to the Canadian Medical Association, every one of whom should be urged to join *NOW*.

Governments, national and provincial, are engaged in careful study of Canada's health needs as they see them. We may expect far-reaching legislation in the not distant future. The Canadian Medical Association is endeavouring, to the best of its ability, to interpret to those in authority what the medical profession believes to be sound procedures; but we must be able to speak for all of the medical profession if we hope to accomplish what every doctor in Canada would wish us to do.

Now is the time for every Division to seek 100 per cent membership in the provincial and national Associations. Remember, if we are a divided profession, half organized and half outside, we cannot expect our voice to be heeded with any greater degree of influence than our stature among our own people would appear to justify.

If we can speak with authority for 9,000 to 10,000 doctors, we can hope to direct our professional destiny.

The present situation demands serious thought and action—and that's the plain truth.

MEMBERSHIP STATEMENT

Province	Members		Gain or loss	Subscribers		Gain or loss
	1940	1941		1940	1941	
British Columbia...	444	416	- 28	16	19	+ 3
Alberta.....	567	567	0	31	29	- 2
Saskatchewan..	311	290	- 21	5	10	+ 5
Manitoba.....	197	333	+136	20	26	+ 6
Ontario.....	1,805	1,520	-285	215	233	+18
Quebec.....	635	652	+ 17	66	98	+32
Nova Scotia...	288	255	- 33	7	13	+ 6
New Brunswick..	145	163	+ 18	3	4	+ 1
Prince Edward Island.....	39	33	- 6	0	0	0
United States..	19	21	+ 2	284	281	- 3
Miscellaneous..	13	12	- 1	81	66	- 15
Military Service.....	187	433	+246			
Totals....	4,650	4,695	+ 45	728	779	+51

Please do your part in the interests of those who are in practice as well as in the interests of those who will come after us.

This is an urgent appeal based upon an urgent need.

The Executive Committee

The Executive Committee of the Canadian Medical Association held a three day session in Ottawa on October 22, 23 and 24, 1941. The following were present: Chairman, Dr. T. H. Leggett, Ottawa; President, Dr. G. S. Fahrni, Winnipeg; President-Elect, Dr. A. E. Archer, Lamont; Honorary-Treasurer, Dr. D. Sclater Lewis, Montreal; British Columbia—Dr. Murray Blair, Vancouver; Alberta—Dr. F. T. Campbell, Calgary; Saskatchewan—Dr. O. E. Rothwell, Regina; Manitoba—Dr. O. C. Trainor, Winnipeg; Ontario—Dr. Harris McPhedran, Toronto; Dr. A. B. Whytock, Niagara Falls; Dr. F. A. Brockenshire, Windsor; Quebec—Dr. Léon Gérin-Lajoie, Montreal; Dr. W. H. Delaney, Quebec; New Brunswick—Dr. C. J. Veniot, Bathurst; Nova Scotia—Dr. H. K. MacDonald, Halifax; Prince Edward Island—Dr. W. J. P. MacMillan, Charlottetown; Dr. Wallace Wilson, Vancouver, Chairman of Committee on Economics (by invitation); Dr. T. C. Routley, General Secretary; Dr. Harvey Agnew, Associate Secretary. Dr. F. S. Patch (Quebec), Dr. W. E. Gray (New Brunswick), and Dr. A. G. Nicholls (Editor) were unavoidably absent.

HEALTH PROGRAM FOR CANADA

The first day was entirely devoted to discussions with the Minister of Pensions and National Health, the Honourable Ian MacKenzie, and members of his Department, on Departmental Plans and Proposals which are under consideration in respect to a broad and comprehensive health program for Canada. Growing out of the discussion, a Committee of Seven was appointed to continue discussions with the Department, the personnel being made up as follows: Dr. T. H. Leggett (Chairman); Dr. G. S. Fahrni (President); Dr. A. E. Archer (President-Elect); Dr. Wallace Wilson (Chairman of the Committee on Economics); Dr. C. J. Veniot (Chairman, Committee on Legislation); Dr. Léon Gérin-Lajoie; Dr. T. C. Routley.

At the conclusion of the conference, the Executive Committee felt that a very useful purpose had been served in the discussions of the day and assured the Honourable Minister that the Association would welcome an opportunity, through the Committee of Seven, to co-operate with his Department in further studying all the broad questions involved. In

due season the help and co-operation of the nine Divisions will be invited by the Committee of Seven in order that the considered expressions of opinion of the profession as a whole in Canada may be made available to the Department in respect to the formulation of plans for the improvement of health services in Canada.

EPIDEMICS

Dr. Trainor of the Manitoba Division, who is Chairman of the sub-committee appointed to consider the possibility of post-war epidemics, reported that progress is being made in organizing and outlining this study throughout Canada.

SECTION OF GASTRO-ENTEROLOGY

Eighteen members of the Association, by petition, invited the Executive to consider favourably the establishment of a Section of Gastro-Enterology within the Association. Any member of the Association who is interested in this proposal is invited to communicate the fact to his Division.

WAR BENEVOLENT FUND

The War Benevolent Fund, in support of the British Medical Association Fund set up to give succour and support to Doctors whose property has been destroyed, reported that nearly \$3,000 has already been subscribed in Canada to the fund. All of this money to date has come from the British Columbia Division, which Division initiated the fund. It is hoped that all the Divisions are giving this matter the sympathetic consideration which it deserves and that they will shortly be heard from in respect to the subscriptions which have been secured.

HONORARY TREASURER'S REPORT

The Honorary Treasurer reported upon the standing of the Association and estimated that, despite the fact that 433 members who are now on active military service are being carried without fee, the Association will close the current year with a slight credit balance.

INDUSTRIAL MEDICINE

On the recommendation of the Committee on Industrial Medicine, which recommendation was supported by General Council, a resolution was passed urging upon the Governmental authorities that, in all war industries in Canada, there be established without delay facilities for: (1) Pre-employment medical examination of workers. (2) Medical supervision of conditions of work. (3) Such medical examination of those already employed as is necessary for the early diagnosis and control of disease and the maintenance of health.

SURGICAL INSTRUMENTS FOR BRITAIN

The action taken by the special committee appointed for the purpose, in inviting by letter every Doctor in Canada to contribute surgical instruments and supplies to Britain, was approved. The Committee expressed the hope that the response would be overwhelmingly gratifying.

THE WINNIPEG MEETING

In reviewing the Winnipeg Meeting, the Executive expressed its satisfaction, and by formal resolution complimented the President, Dr. G. S. Fahrni, and all the ladies and gentlemen associated with him, whose efforts had been so highly successful. As a matter of interest, the registration figures are here presented:

British Columbia	40
Alberta	49
Saskatchewan	104
Manitoba	389
Ontario	104
Quebec	46
Nova Scotia	6
New Brunswick	5
Prince Edward Island	2
United States	27
Miscellaneous	4
	<hr/>
	776
Ladies	242
	<hr/>
	1,018

ANNUAL MEETING, 1942

The President-Elect, Dr. A. E. Archer, reported that excellent progress is being made in connection with planning the 1942 annual meeting at Jasper Park, during the week of June 15, 1942. The entire facilities of the hotel have been engaged for the week. Special railway and hotel rates of a most attractive nature have been secured. The Program Committee is already at work on the scientific aspect of the meeting. Members are now reminded of the date of the meeting. All particulars about rates will be published at an early date. Reservations directly to the Hotel are invited.

The Executive Committee noted with much satisfaction that the British Columbia Division has decided to move its annual meeting to Jasper next year, which will take the form of a business meeting to be held concurrently with our annual meeting.

REHABILITATION OF YOUTHS BELOW CATEGORY A

The Committee had before it a statistical analysis of the categorization of 50,000 youths who had presented themselves for examination as a prelude to being called for military training. Major-General L. R. LaFleche, Deputy Minister of the Department of National War Services, and Dr. H. H. Christie, Medical Director, were present by invitation. It was

the unanimous opinion of the Committee that a program of rehabilitation sponsored and financed by the Government, should be undertaken and offered to those youths whose categories were below A and whose correction of disabilities would raise their categories, in order that more man power might be made available for the armed forces and for war industry. The views of the Committee were finally crystallized in the following Minute:

1. "That the Canadian Government should embark upon a rehabilitation program at the Government's expense.
 2. "That, having studied the statistics furnished by Major-General LaFleche we are of the opinion that many of these young men could have their disabilities corrected and thus be made available for war service.
 3. "That the Canadian Medical Association will be happy to co-operate with the Government in connection with this rehabilitation program.
- "It was duly moved, seconded and agreed that,
- "Following a lengthy conference with Major-General LaFleche on the large number of prospective trainees who have been found to be physically unfit for military service, many of whom we believe to be suffering from disabilities which are easily curable, this Executive Committee respectfully suggests to the Government of Canada that a rehabilitation program be instituted in respect to those prospective trainees who were medically examined and found to have physical disabilities, in an endeavour to bring them into a higher category than that under which they are now classified; and the Canadian Medical Association offers its fullest co-operation in any program of this nature which may be undertaken."

This expression of opinion has been forwarded to the Right Honourable the Prime Minister of Canada and other members of his Cabinet.

THE DEPARTMENT OF HOSPITAL SERVICE

The Department of Hospital Service reported continued progress in connection with hospital organization and allied problems.

THE WAR

This subject naturally engaged the attention of the Committee for a considerable period of time. A report was received from each of the nine Divisions with respect to the degree of co-operation which exists between our Local Committees and the administrative Medical Officers of the three Services.

It would appear at the present time that satisfactory progress is being made in securing medical personnel. Your Committee was given to understand that approximately 300 additional medical officers would be required during the coming year. It is confidently believed that the medical profession will respond to the call in sufficient numbers to meet the needs.

ORTHOPÆDIC HOSPITAL FOR SCOTLAND

Co-operating with the Canadian Red Cross, the Committee authorized the establishment of an Orthopædic Hospital to proceed to Scotland where it will function under the Scottish Board of Health. A special committee under the Chairmanship of Dr. D. E. Robertson of Toronto has this matter in hand.

MEDICAL BOARDS

On the invitation of Major-General LaFleche, Associate Deputy Minister of the Department of National War Services, and with the co-operation of the nine Divisions, Medical Boards have been established in 39 towns and cities of Canada. These Boards will function in re-examining recruits called up for military training who were rejected at the first medical examination.

SECOND AFFILIATED MEDICAL SOCIETY OVERSEAS

An application was received from the 2nd Canadian Division Medical Society Overseas that it be granted affiliation with the Canadian Medical Association. The request was heartily acceded to. We now have two affiliated Medical Societies Overseas, the 1st Canadian Division Medical Society having become affiliated more than a year ago.

RESTRICTION OF SALE OF GASOLINE

Communications from many parts of Canada indicate that a certain amount of inconvenience has been occasioned members of the medical profession due to the restrictions which have been placed upon the sale of gasoline. In this connection, conferences have already taken place and the General Secretary was authorized to watch further developments.

CONCLUSION

A number of other matters of interest to our Association were considered and passed to various committees for further study and report. All of which is respectfully submitted.

T. C. ROUTLEY,
General Secretary.



Jasper Park Meeting, 1942

It is not too soon to remind our members that the annual meeting in 1942 will be held at Jasper Park, Alta., June 15th to 19th. We publish herewith an introductory illustration which will give some idea of the pleasant surroundings under which we are to meet.

This is a view of Bungalow Avenue and shows some of the modest looking bungalows which make up Jasper lodge, and which afford accommodation for 650 guests. These bungalows provide every comfort and convenience, and in addition are placed in surroundings of great beauty.

We look for a large and representative assembly.

Hospital Service Department Notes

War-time Emergencies Discussed at Ontario Hospital Association Convention

War-time emergencies in civilian hospitals and how to prepare for them was one of the main topics of discussion at the recent Ontario Hospital Association Convention held in Toronto on October 9th to 11th. Dr. B. T. McGhie, Deputy Minister of Health and Chairman of the Provincial A.R.P. Committee, outlined some of the preparations, such as, extra accommodation and supplies, training of personnel, protection of hospitals buildings and methods of evacuation in case of attack, which hospitals should make.

A Quiz Program conducted by Dr. Harvey Agnew, with two teams (three men and three women) of well known hospital administrators was a most popular session. An open session was held on hospital administration problems

when Miss E. McKee, of Brantford, spoke on the preparation of the hospital administrator, Dr. M. G. Brown, of Hamilton, and Mr. F. H. Holmes, of St. Catharines, on hospital problems during the war period, and Dr. Edwin Robertson, of Kingston, on what the hospital architect should consider in the design of a modern obstetrical department. Sectional meetings were held by the Women's Hospital Aids Association of Ontario, the Nursing Section of the Ontario Hospital Association, the Ontario Association of Record Librarians, the Ontario Association of Medical Social Workers and Hospital Dietitians.

Experiences in France during its fall in June, 1940, were related very vividly by Brigadier G. P. Vanier, D.S.O., M.C., guest speaker at the banquet. Dr. George F. Stephens, President of the Canadian Hospital Council, addressed the delegates on events of the past year which have affected hospitals. He stressed the fact that civilian hospitals were not prepared, in case of a large scale emergency caused by direct enemy attack, sabotage or explosion in munition plants, to furnish blood for injured civilians, and sug-

All communications intended for the Department of Hospital Service of the Canadian Medical Association should be addressed to Dr. Harvey Agnew, 184 College Street, Toronto.

gested that some arrangement be made whereby hospitals could keep an adequate supply of blood on hand.

Dr. F. W. Routley, in his secretary's report, told of the excellent progress being made by the Ontario Plan for Hospital Care. At the present time 50 per cent of Ontario hospitals have joined the plan, and enrolment of participants is now over 20,000. After only six months' operation the Plan is "out of the red". Mr. N. Saunders, Director of the Plan, stated that the question of enlistment of subscribers has caused grave concern and that the Board has decided to extend benefits as before enlistment, considering the wife as the head of the family. The Ontario Plan has also expressed willingness to accept as subscribers families of enlisted men, who were not subscribers previous to enlistment, provided deductions were made from the dependents' allowances by the federal government.

Mr. Clarke Keith, of Windsor, was elected President. Other officers are: Honorary President—Dr. L. C. Fallis, of London; Honorary Vice-president—Mr. C. J. Decker, of Toronto; President-elect—Mr. E. A. Horton, of St. Thomas; First Vice-president—Mrs. O. W. Rhynas, of Burlington; Second Vice-president—Miss E. M. McKee, of Brantford; Third Vice-president—Mr. J. W. H. Bower, of Toronto; Secretary-Treasurer—Dr. F. W. Routley, of Toronto.

Canadian Hospital Council Meeting

The Canadian Hospital Council held its sixth biennial meeting at the Windsor Hotel, Montreal, October 10th and 11th, with Dr. George F. Stephens, superintendent of the Royal Victoria Hospital, Montreal, in the chair.

Much of the discussion centred around the difficulties facing hospitals in wartime: the enlistment of personnel, the increasing cost of supplies, and the rôle of the hospitals in national defence. Concern was expressed as to the extent to which the defence preparations, particularly, A.R.P., had extended from the federal director to the local areas. In this connection, Dr. Ross Millar of the Department of Pensions and National Health stated that the government had obtained from the Canadian Hospital Council a list of hospitals prepared to take extra patients in a national emergency, and that stores of beds and mattresses are located at strategic points all over the Dominion which can be shipped to these hospitals on a few hours' notice.

In view of the shortage of graduate nurses and of applicants for entrance to schools of nursing (particularly serious in Montreal and the Maritimes), the Council passed a resolution urging approved schools of nursing to enroll as large classes of probationers as possible, and also urged the Government to work out a plan whereby approved schools of nursing could be subsidized (as is being done in the United

States) to help meet the extra expense involved. It was suggested that a "campaign" for enrolment in the schools of nursing might be launched on a patriotic basis. Pre-nursing university courses and centralized teaching were also suggested as solutions to the shortage of teaching personnel.

An important announcement in connection with the rehabilitation of returned men was that made by a Department official to the effect that where many soldiers are stationed and where there is no federal hospital, the D.P.N.H. will purchase equipment for physical rehabilitation and loan it to the civilian hospitals.

In consideration of the fact that the Department of Pensions and National Health is now taking steps to formulate plans for a possible plan of health insurance which may be introduced in the future, a resolution was passed assuring the government of the Council's desire to co-operate in any sound plan for improving the quality and lessening the burden of the cost of medical care, and requesting that the Council be accorded the privilege of naming a representative on any advisory board set up to consider the formation of any plan of health insurance.

The Council also urged that the government set up a plan of hospital care insurance to cover all soldiers' dependents resident in Canada, such to be financed by a small monthly deduction at the source from assigned pay and allowances. It was also suggested that if a cost-of-living bonus should be added to the present allowances, a portion of this could be in the form of hospitalization benefits.

The report of the special committee on Nomenclature recommended to the Executive the adoption of the "Standard Classified Nomenclature of Disease", that it should urge the use of this system in all hospitals throughout Canada, and that its advantages be brought to the notice of all active practitioners as well as medical students. These findings were in agreement with those of the Committee on Nomenclature of the Canadian Medical Association, already endorsed by the Executive of that body.

Officers elected are: President—Dr. George F. Stephens, Montreal; First Vice-president—Mr. H. G. Wright, Saint John; Second Vice-president—Dr. A. K. Haywood, Vancouver; Executive Members—Mr. J. H. Roy, Montreal, and Dr. A. F. Anderson, Edmonton.

Standard Classified Nomenclature of Disease Recommended by Canadian Hospital Council

The special committee on Nomenclature of the Canadian Hospital Council in its report to the Council at the Montreal meeting in September recommended the general adoption of the Standard Classified Nomenclature of Disease. This report is a close parallel in its recommendations to that of the Special Committee on Nomencla-

ture of the Canadian Medical Association, the report of which was adopted at Winnipeg in June.

RECOMMENDATIONS

The recommendations of this Committee on Nomenclature of the Canadian Hospital Council are as follows:

1. That an endeavour be made to have one system of nomenclature used by hospitals throughout Canada.
2. That the "Standard Classified Nomenclature of Disease" be officially recognized by the Canadian Hospital Council.
3. That hospitals now using one of the older systems be encouraged to replace such by the "Standard Classified Nomenclature of Disease".
4. That as occasion arises, hospitals, irrespective of size, in which diseases are not indexed at the present time, provide themselves with a copy of the "Standard", and by every means in their power endeavour to have each doctor employ the terms of the "Standard" when writing a diagnosis on a patient's record, or arrange to have the hospital record librarian permitted to substitute the proper terms.
5. That a plan of education be devised whereby the "Standard Classified Nomenclature of Disease" be brought to the notice of all active practitioners both in general and in special practices as well as to the students now training in the medical schools.

The Committee was made up of Mr. Fred J. Fish, Record Librarian, Vancouver General Hospital (Chairman); Dr. A. Hardisty Sellers, Medical Statistician for Ottawa; Miss Isobel Marshall, R.R.L., Brantford General Hospital; Miss Lillian Johnstone, R.R.L., Hamilton General Hospital; Dr. George Hooper, Supervisor of Records, Ottawa Civic Hospital; Dr. H. E. MacDermot, Director of Records, Montreal General Hospital; and Rev. Sister Mary Paul, Record Librarian, St. Michael's Hospital, Toronto.

After reviewing a number of the more widely used systems, the Report states, "With the withdrawal of the Ponton Classified Index of Diseases and Operations, it would seem obvious that the logical recommendation for adoption would be the 'Standard Classified Nomenclature of Disease'."

PLAN OF EDUCATION NEEDED

The Committee considers it important that active steps be taken to hasten its general adoption and that "its acceptance be not allowed to advance at its own leisurely pace". A definite plan of education is needed. The avenues in which support or education would be most

valuable include the medical schools, and such hospital personnel as the pathologists, the radiologists, the anaesthetists, the residents, the medical librarians and the physiotherapists. The official journals of medical, nursing and kindred societies could be of considerable assistance. In order to gain the co-operation and goodwill of the practising physicians, the Canadian Medical Association and its provincial divisions could play a most helpful rôle.

As the medical colleges have an excellent opportunity to educate the medical students to use a uniform system, the committee suggests that every effort should be directed to secure their co-operation. Although textbooks use varied and frequently hybrid systems, the consistent use of one system by the teaching faculty and the teaching hospitals would be of tremendous educational advantage.

"Even if it be not expedient to officially adopt this nomenclature, senior students could be made familiar with it so that there would be less difficulty in gaining their co-operation in its use during their internship or later in practice. It would appear at the present time that very few medical graduates have been made acquainted at any time during their undergraduate course with any of the several well prepared and heretofore accepted systems."

In hospitals, although a great many now use the "Standard Classified" system, there is some hesitation on the part of the management in adopting a new system unless the doctors desire it. "Unless assured that the medical staffs will really take hold and follow the system, it is doubtful if hospitals are justified in going to the expense of setting up a system which in turn implies the purchase of copies for the different wards, etc., and the possible training of the record librarian in the use of the system."

"It would appear, therefore, that the medical staffs of hospitals should be encouraged to study this whole question and that they themselves should be the ones to ask the administration to set up the system. For this reason we welcome the definite recommendations made by the Committee on Nomenclature of the Canadian Medical Association."

The *medical records librarians* could help the medical staff, the interns and the nurses in becoming familiar with the system. "Much could be accomplished, too, if writers in medical and nursing journals would use the proper terminology in preparing articles. Editors of such journals might endeavour also to co-operate by adhering to the 'Standard Classified Nomenclature of Disease' in editing scientific articles on clinical medicine." This system of nomenclature is now officially endorsed by nearly all of the national medical, hospital and allied organizations on this continent and has been recommended for adoption in some of the leading teaching hospitals in Great Britain.

The War

Le Régiment de la Chaudière A F

Les origines du Régiment de la Chaudière remontent à l'ancienne milice canadienne-française, à la milice du seigneur Taschereau, durant la domination française. C'est le sang de cette vieille milice qui s'est conservé dans le Régiment provisoire de Beauce du 9 avril 1869; dans le 23e Bataillon d'Infanterie, en 1871; le 92e en 1900; le Régiment de Beauce, le 15 mars 1921; le Régiment de Beauce et Dorchester, le 8 février 1932; et le Régiment de la Chaudière, mitrailleurs, le 15 décembre 1936, en service actif en septembre 1939, comme mitrailleurs d'abord dans une division de l'active et, ensuite, dans une Brigade d'infanterie d'une autre division. Ce régiment changeait de nom mais demeurait le même en méritant la devise qu'il porte, "*Aera perennius*"—"Plus solide que l'airain".

La seigneurie Taschereau fut établie en 1736, sur les bords de la rivière Chaudière, à 30 milles de Québec. Elle avait 20 milles de longueur et 6 milles de largeur de chaque côté de la rivière. Le manoir était bâti sur la rive nord, à la sortie du village de Sainte-Marie de Beauce. Le prestige qu'ont donné les Taschereau à la vie militaire a attaché plusieurs générations de la Beauce et de Dorchester à la milice rurale.

On dit dans la Beauce que Charles-Antoine Taschereau servit sous les ordres de Montcalm en 1758, et que Gabriel-Elzéar Taschereau combattit Wolfe en 1759. Lors de l'invasion américaine, en 1775, Gabriel-Elzéar fut nommé colonel de son bataillon de milice par Guy Carleton, poste qu'il occupa jusqu'à sa mort. Thomas-Pierre-Joseph Taschereau entra en qualité de cadet dans le Royal Canadien ou "Royal Canadian Volunteers", régiment levé au Canada pour remplacer les troupes anglaises dont on avait besoin ailleurs. En 1797, il était lieutenant et en garnison à Niagara. En 1802, le Royal Canadien fut licencié et Thomas-Pierre-Joseph Taschereau, mis à demi-solde, s'en vint résider à Sainte-Marie de Beauce.

Dès le 6 février 1869, un certain nombre de compagnies indépendantes étaient autorisées dans le district No 7 qui comprenait alors la ville de Québec et ses alentours. Il y avait deux compagnies indépendantes à St-Vital de Lambton, une autre à St-François, à Aylmer, à Ste-Marie de Beauce, à Ste-Claire, Ste-Justine et St-Anselme, dans Dorchester. Il y avait déjà assez de compagnies pour former deux bataillons. L'ordre général qui crée les deux bataillons est en date du 9 avril 1869. Le bataillon provisoire de Beauce est composé de cinq compagnies, avec ses quartiers-généraux à Ste-Marie de Beauce, et commandé par Charles-Antoine Taschereau, qui est remplacé presque aussitôt par le colonel Henri Duchesnay.

Le bataillon provisoire de Dorchester, composé de quatre compagnies, est commandé par le

capitaine Louis Fortier, commandant de la compagnie localisée à Ste-Claire. Les quartiers-généraux sont à St-Anselme. Ces deux régiments vécurent ainsi l'un près de l'autre jusque vers 1900.

Vers 1871, le Provisoire de Beauce devient le 23e bataillon et le Provisoire de Dorchester, le 92e.

Le Lt-colonel H.-J.-J. Duchesnay commande le 23e de 1869 à '71 et de 1880 à '87. De 1871 à 1880, le régiment fut commandé par le lieutenant-colonel Laurent Bernier. A la mort du Lt-colonel H.-J.-J. Duchesnay, le commandement passe entre les mains du Lt-colonel J. G. Bignell de Lambton, 1887 à 1898. En 1898, lui succède Thomas-Jacques de Montarville Taschereau. Le bataillon est organisé en huit compagnies. C'est alors qu'est créée une compagnie de signaleurs, la première dans le district de Québec. Les membres de cette compagnie sont choisis dans la classe des finissants du collège de Ste-Marie de Beauce, tenu par les Frères des Ecoles Chrésiennes. Les résultats furent magnifiques et une mention spéciale lui fut accordée parmi les signaleurs de tout le Dominion.

En 1900, le colonel Th.-J. de Montarville Taschereau est transféré au 3e Régiment de la force permanente stationnée à Halifax, durant la guerre du Transvaal. Le major Gustave Taschereau lui succède, mais le 23e disparaît. Ce chiffre est donné au "Northern Ontario Regiment", et les officiers passent avec leurs hommes au 92e Régiment, l'ancien de Dorchester.

Le 92e avait eu comme commandants le major Louis Fortier, 1869-1875; le lieutenant-colonel Louis Genest, 1875-1896; le lieutenant-colonel Achille Chabot, 1896-1902. A son retour de la guerre du Transvaal, T.-J. de Montarville Taschereau reprend le commandement de 1902 à 1904 pour le passer au lieutenant-colonel G.-A. Taschereau, ancien officier du 23e, qui l'exerce de 1904-1906 pour le reprendre de nouveau de 1906-1908. Le lieutenant-colonel E.-S. Bois du 9e Voltigeurs de Québec lui succède de 1908 à 1917. C'est durant cette période, en 1912, que les numéros des compagnies sont remplacés par des lettres. C'est en 1917 que le senior des officiers, le major E. Chabot, prend charge du régiment et établit les quartiers-généraux à St-Isidore de Dorchester. A la fin de la guerre, en 1919, le régiment prend le nom de Régiment de Dorchester. En 1921, le régiment devient le Régiment de Beauce et est commandé par le lieutenant-colonel J.-A. Gilbert (1921-1927). En 1922, l'écusson du Régiment de Beauce est autorisé: "Une couronne de feuilles d'érables; un cercle portant les mots 'Régiment de Beauce, Québec'; au centre du cercle, une grande fleur-de-lis; au bas du cercle, la devise 'Dieu, Roi, Patrie'; au centre du cercle, un castor surmonté de la couronne impériale."

Les quartiers-généraux sont à Beauceville avec quatre compagnies: une à St-Georges, une

à St-Isidore, une à St-Joseph, une à Ste-Claire.

Les commandants du Régiment de Beauce: Lieutenant-colonel J.-A. Gilbert, 1921-1927; Lieutenant-colonel G.-T. Taschereau, 1927-1929; Lieutenant-colonel E. Chabot, 1929-1930; Lieutenant-colonel J. Turgeon, 1930-1932.

Le Régiment de Beauce change encore de nom et devient le Régiment de Dorchester et Beauce en 1932.

Les commandants furent: le lieutenant-colonel J. Turgeon (1932-35), et le lieutenant-colonel L.-F. Gignac (1935-36).

Quand les deux vieilles unités furent d'égales forces, et d'un zèle égal, elles s'unirent avec une troisième plus moderne, le 5th Machine Gun, un régiment de mitrailleurs. Toutes trois adoptent un nom qui les conduira désormais jusqu'à la gloire: le Régiment de la Chaudière.

Les commandants: Lieutenant-colonel J.-L. Reiman (1936-39); Lieutenant-colonel G.-R. Bouchard (1939-41); Lieutenant-colonel J.-J. Chouinard (depuis 1941).

Aujourd'hui, le Régiment de la Chaudière est embrigadé comme régiment d'infanterie, dans une division affectée au service outre-mer.

Pendant son entraînement, le Régiment de la Chaudière a été remarqué surtout en deux circonstances: il fournit la garde d'honneur lors de l'ouverture du Parlement provincial de Québec, en janvier 1940, alors qu'il fut passé en revue par le lieutenant-gouverneur, le major-général Sir Eugène Fiset. Il fournit aussi la garde d'honneur lors de l'arrivée à Québec de Son Excellence le gouverneur-général du Canada, Lord Athlone.

Le 5e bataillon C.M.G.C. est une unité organisée au lendemain de la guerre, avec ses quartiers-généraux à Québec.

Lors de l'organisation du Régiment de la Chaudière, le quartier-général fut d'abord établi à Ste-Claire et, ensuite, au Lac Mégantic. Cette nouvelle désignation exigeait un nouvel écusson qui fut accepté par Sa Majesté le 1er juillet 1938. En voici la description: deux mitrailleuses supportées par deux feuilles d'érable, le tout surmonté d'un castor portant une fleur de lis, et, pour devise, ce vers d'Horace "*Aera perennius*", "Plus solide que l'airain".

Il est intéressant de noter que le Régiment de la Chaudière est composé exclusivement de ruraux.—From *The Salute*, 1941, 8: 8.

Honours and Awards to Canadians and Others in British Service

Bar, to D.F.C., Wing Comdr. J. A. Kent, D.F.C., A.F.C., Winnipeg. Air Force Cross, Flt.-Lt. F. E. W. Birchfield, New Westminster, B.C.

Distinguished Flying Cross, Acting Flt.-Lt. R. C. Patrick, Richmond Hill, Ont., Sqdr. Leader A. D. Nesbitt, Montreal.

Distinguished Flying Medals, Sgt. Tommy Regler, Toronto, Sgt. James Douglas Woodburn, Gloucester, Ont.

British Empire Medals, Military, Leading Aircraftsmen, P. C. Contin, Victoria, B.C., C. R. James Seamans, Sask.

Distinguished Service Medal, Gunner William Pike, Boston, Mass., serving on *H.M.S. Warspite*.

Order of British Empire (Military), Wing Commander Walter Hugh Merton, R.A.F., Agassiz, B.C.

Awarded Air Trophy for 1940, T. W. Spiers, Superintendent of Maintenance for Canada Airways.

Commended in Orders, Lt.-Col. A. T. Howard, Officer Commanding Advanced Training Centre, Farnham, Que.—*The Salute*.

Officers of the Canadian Army are going to have to prove that they are competent to hold their appointments. Three boards of examination have been set up. The Atlantic command and Quebec, the chairman of this board is Major-General T. L. Tremblay; the Central Command, Ontario, under Major-General T. V. Anderson, the Pacific Command, Manitoba to British Columbia, under Major-General, the Hon. W. A. Griesbach.—*The Salute*.

An American Doctor on the War

Dr. David Cheever, President of the American Association of Surgeons, in his presidential address* on "Mars and Æsculapius", delivered at White Sulphur Springs on April 28th, paid tribute to the fact that 83 per cent of the Fellows of the Association volunteered for the last war, and gave details of the part played by the American medical profession in general. On the subject of the present war it is worth quoting his remarks: "With our weight tilting the scale the war was won, but the peace, it seems, was lost, for now, scarcely a score of years later, we stand again at the gates of Armageddon. Our idealism in undertaking to ensure the future of democracy by waging a war to end war has become a mockery. The same enemy confronts us, his purpose far more sinister, his strength vastly augmented by the devotion of the whole wealth and power of a great nation for the sole purpose of ruthless aggressions, his resources multiplied by those of the peace-loving, terrorized, conquered peoples; his mailed fist supported by allied ghouls whose nostrils tell them—falsely, to be sure—of the expected kill. More dangerous is he because of his strength, but also because of the doctrine with which he has inoculated the people—a doctrine at once ludicrous, absurd, but dreadful in its evil intent, of a superior race predestined by the Creator to prosper at the expense of all other peoples. This foe is bending all the agencies of the physico-chemical and physiologic sciences to his purpose, and showers death in its most ghastly forms on man, and destruction on the monuments of

* *Ann. Surg.*, 1941, 113: 881.

his civilization to a degree which is callously designed to involve a nation in its totality if it refuses to submit. The unarmed, the defenceless, the weak, the aged, the young of either sex have no privilege of even partial exemption, but rather suffer the more because they have not the strength for self-defence. And, standing rock-like against this monstrous, reckless, merciless destroyer stands the English-speaking island Empire and her overseas daughters, shorn by enemy subjugation of all her allies save one, making us to consider whether a precarious freedom can be enjoyed alone in case of her defeat." He then goes on to discuss, without pronouncing on their validity, the theories of the opportunity for medical development in war as opposed to peace, and from the historical and scientific point of view traces them from their origins. His epilogue ends thus: "Again Britain and her daughter nations, bleeding but with heads unbowed, stand against this monstrous thing. Again America is moving to her side; again the weight of her power will press down the scale pan wherein lie liberty and justice. When the victory shall be won, let our care be that mankind shall also win the peace by lavishing on its nurture something of the same energy, treasure, and self-sacrifice which is poured into the lap of Mars." These words of Dr. Cheever's come as a high encouragement to us on this side of the Atlantic.—*Brit. M. J.*, 1941, 2: 483.

Military Neurosurgery

We have received from the Department of National Defence a copy of a manual on "Military Neurosurgery" prepared by Dr. Wilder Penfield. This is designed for use in the field and is of convenient size. The text is clear and succinct. The illustrations are excellently simple and informative. The price is 50 cents and copies may be obtained from the Government Distribution Office, Government Printing Bureau, Ottawa.

War Literature

THE BRITISH MEDICAL JOURNAL

- A Survey of One Hundred Cases of War Neuroses, J. D. Sutherland, 1941, 2: 365.
- Some Contributions to War Surgery from the U.S.S.R., R. Clarke, 1941, 2: 372.
- Traumatic Shock, Past, Present and Future (leading article), 1941, 2: 380.
- Tenosynovitis of the Tendo Achillis, A. A. Williams, 1941, 2: 377.
- Scabies. Several articles, pp. 397 to 405.
- Rehabilitation of Injured Air Crews, Flt.-Lt. R. N. Houlding, 1941, 2: 429.
- Avoidable Disability in Recent Amputations, W. R. D. Mitchell, 1941, 2: 437.
- Extension Foot-piece and Support for Use with the Thomas Leg-splint, Col. E. A. McCusker, A.D.M.S. of a Canadian Division, 1941, 2: 442.
- Bacteriology of Air-raid Wounds Examined Within Forty-eight Hours of Infliction, E. T. C. Spooner, 1941, 2: 477.

THE CANADIAN MEDICAL ASSOCIATION JOURNAL
 Special Problems of the R.C.A.F. Medical Officer, Wing Commander G. E. Hall, 1941, 45: 387.
 The Peptic Ulcer Problem, R. W. I. Urquhart, A. C. Singleton and W. R. Feasby, 1941, 45: 391.
 Post War Problems, A. F. Menzies, 1941, 45: 399.
 A Comparison of Isinglass and Gelatin as Blood Substitutes, E. T. Waters, 1941, 45: 395.

JOURNAL OF THE ROYAL ARMY MEDICAL CORPS
 Dyspepsia in the Forces, Col. H. L. Tidy, 1941 77: 113.
 Acuity of Hearing in Searchlight and Other Personnel, Major T. L. Clarke, 1941, 77: 113.

JOURNAL OF LARYNGOLOGY AND OTOTOLOGY
 The Protection of Hearing, E. D. D. Dickson and A. W. G. Ewing, 1941, 56: 225.

THE LANCET

Simple System of Splinting for Lower Limbs, J. S. Smillie, 1941, 2: 304.
 Treatment of Burns in Spain (note), L. G. Oliveros, 1941, 2: 358.
 Influenza in England in 1940-41, Andrewes *et al.*, 1941, 2: 387.

PROCEEDINGS OF THE ROYAL SOCIETY OF MEDICINE
 The Treatment of War Injuries of the Eye, T. M. Tyrrell, 1941, 39: 725.

WAR MEDICINE

Electrocardiography in Military Medicine, Francis C. Wood, C. C. Wolforth and T. G. Miller, 1941, 1: 696.

BOOKS AND PAMPHLETS

- Medical Diseases of War, Sir Arthur Hurst, Second Edition, Edward Arnold & Co., London, Price 18s.
- Your Health in Wartime. A Doctor Talks to You, Dr. Charles Hall, University of London Press, Price 1s.
- A Handbook for Industrial Nurses, Marion M. West, Edwin Arnold & Co., London, 1941, Price 3/6.
- Handbook of First Aid and Bandaging, A. D. Belilios, D. K. Mulvaney, K. F. Armstrong, C. W. Hipkins, Baillière, Tindall & Cox, London, 1941, Price 3/6.
- Wounds and Fractures, H. W. Orr, C. C. Thomas, Springfield, 1941, Price \$5.00.

Medical Societies

The Royal College of Physicians and Surgeons of Canada

The twelfth annual meeting of the Royal College of Physicians and Surgeons of Canada, was held in the auditorium of the National Research Laboratories Building, Sussex Street, Ottawa, on Saturday, October 25, 1941.

The Committee on Annual Meeting Program had arranged for the following.

SCIENTIFIC PROGRAM

A. T. Mathers, M.D., C.M., F.R.C.P.(C), Winnipeg, Royal College Lecturer, 1941. "Recent advances in medicine—psychoneurosis in time of war."

Colonel E. W. Archibald, M.D., C.M., F.R.C.S. (Hon.), F.R.C.S.(C), F.R.A.C.S.(Hon.), Ottawa, Royal College Lecturer, 1941. "New and old in war surgery".

CONVOCATION

Dr. Albert LeSage, Vice-President, Division of Medicine, presented to the President the candidates qualified, by examination, to receive Fellowship in the Royal College of Physicians of Canada: Captain Arthur W. Bagnall, Camp Borden; Dr. Jean B. A. J. Baillargeon, Montreal.

Dr. John A. Gunn, Vice-President, Division of Surgery, presented to the President the candidates qualified, by examination, to receive Fellowship in the Royal College of Surgeons of Canada as follows: Dr. Jessie C. Gray, Toronto; Dr. François H. Coté, Ottawa; Dr. Max E. Geisinger, Hardisty, Alberta; Dr. William L. M. King, Toronto; Dr. Angus D. McLachlin, Toronto; Dr. Harold L. Richard, Edmonton; Dr. William A. Shandro, Vegreville, Alberta.

Of the applications for Ad Eundem Fellowship received during the year two were acted upon favourably and Fellowship in the Royal College of Surgeons of Canada was granted to the following: Dr. Russell K. Magee, Peterborough; Dr. Herbert F. Moseley, Montreal.

LECTURESHIP DIPLOMAS

Lectureship Diplomas were awarded to: Col. Edward W. Archibald, 1941 Lecturer of the Royal College of Surgeons of Canada. Prof. Emile Gaumond, Conférencier du Collège Royal des Médecins et Chirurgiens pour l'année 1941. Dean Alvin T. Mathers, 1941 Lecturer of the Royal College of Physicians of Canada.

HONORARY FELLOWSHIP

Honorary Fellowship in the Royal College of Physicians of Canada was conferred upon: Sir William Wilson Jameson, M.A., M.D., F.R.C.P., D.P.H., Principal Medical Officer, Ministry of Health, London.

Honorary Fellowship in the Royal College of Surgeons of Canada was conferred (in absentia) upon: Rear-Admiral Gordon Gordon-Taylor, O.B.E., M.S., B.Sc., F.R.C.S., F.R.A.C.S.(Hon.), London.

With the Fellows standing the names of those deceased during the year were read by the Honorary Secretary, as follows: Dr. I. G. Bogart, Kingston, January, 1941; Sir Frederick Banting, Toronto, February, 1941; Dr. Paul Garneau, Quebec City, March, 1941; Dr. David Low, Regina, March, 1941; Dr. B. F. Macnaughton, Montreal, October, 1941.

A report of the activities of the Council during the year was presented by the President.

Meetings had been held in Winnipeg, on June 26th, and again in Ottawa (three sessions) at the time of the annual meeting.

A *Special* examination was held for Primary candidates: Written Examinations were held on

May 30th and the Oral Examinations on June 17th and 18th—at Toronto only.

The annual examinations were held as follows: Written, on September 29th, 30th and October 1st. Oral and Clinical Examinations took place in Montreal on October 21st, and in Toronto on October 23rd and 24th.

Of the twenty candidates who tried the Primary Examinations during the year eleven were successful.

The names of the successful candidates are as follows: Dr. Edwin L. Brown, Montreal; Dr. Albert Coutu, Montreal; Dr. Norman C. Delarue, Toronto; Dr. William P. Goldman, Alberta; Dr. Pierre del Vecchio, Montreal; Dr. Charles Sheard (Jr.), Toronto; Mr. Joseph A. Delaney, Montreal; Mr. Fredrick F. Howatt, Kingston; Mr. Alan M. Inglis, Winnipeg; Mr. James R. McCorriston, Kingston; Mr. Karl T. Moller, Toronto.

The following calendar for 1942 has been agreed to: June meeting of Council, Jasper, Alberta, Monday, June 15th. Annual Meeting, Ottawa, Saturday, October 24th. Written Examinations, Monday, September 28th, Tuesday, September 29th, Wednesday, September 30th. Oral and Clinical Examinations, Montreal, Monday, October 19th, Tuesday, October 20th; Toronto, Wednesday, October 21st, Thursday, October 22nd.

ELECTIONS TO COUNCIL

This year's nominations and elections resulted in the election by acclamation of the nominees by Council.

At the first meeting of the new Council the following Officers were elected: *President*, Dean A. T. Mathers, Winnipeg; *Vice-President*, Division of Medicine, Prof. K. A. MacKenzie, Halifax; *Vice-President*, Division of Surgery, Dean Charles Vézina, Quebec City. Executive Officers were elected as follows: *Honorary Secretary*, Dr. Warren S. Lyman, Ottawa; *Honorary Treasurer*, Dr. R. E. Valin, Ottawa; *Honorary Assistant Secretary*, Dr. John E. Plunkett, Ottawa.

The Annual Dinner was held at the Chateau Laurier. The guest of honour was Sir W. Wilson Jameson who addressed the Fellows after the dinner.

After a short recess the Annual Business Meeting of the College was convened with the President, Dr. Wilder Penfield in the Chair.

Under the auspices of the Royal Colleges a lecture entitled "La syphilis au Canada français hier et aujourd'hui" was given at a meeting of the medical profession held at Quebec City, on October 3rd, by Dr. Emile Gaumond, Professeur de Dermatologie et Syphiligraphie à la Faculté de Médecine de l'Université Laval.

D. THOMPSON,
Executive Secretary.

La société médicale des hôpitaux universitaires de Québec

La séance de cette Société, tenue à la Faculté de médecine le 3 octobre, est consacrée entièrement à l'étude de la Syphilis. Suivent les résumés.

LA SYPHILIS AU CANADA-FRANÇAIS: HIER ET AUJOURD'HUI.—E. Gaumond.

La syphilis constitue avec la tuberculose et le cancer une des trois entités morbides qui affligent l'humanité depuis de très nombreuses années, des siècles même. Malgré que l'on connaisse bien l'agent de la syphilis et que l'on possède un traitement dit spécifique, la maladie est loin d'être disparue, elle est bien vivante et ne disparaîtra sans doute qu'après une lutte qui sera rude et devra être sans répit. Dans ce travail, la syphilis au Canada-français est étudiée à un triple point de vue: historique, thérapeutique et prophylactique.

La première mention de la syphilis au Canada fut faite par Cartier lors de son second voyage; d'après le découvreur du Canada, au moins un membre de son équipage souffrait de cette maladie. Seul Pierre Kalm, en 1748, note que la maladie existait chez les Indiens et même chez les Français, mais son affirmation reste isolée car les Relations des Jésuites, les Annales de l'Hôtel-Dieu n'en font pas mention, et à nulle part on ne trouve de documents laissant croire que la syphilis était fréquente au Canada avant la conquête. La maladie de la baie St. Paul est ensuite étudiée en détail ce qui termine à peu près le côté historique de la question.

Le point de vue thérapeutique est ensuite considéré et certaines directives générales de traitement sont incluses dans la communication. Pour terminer ce travail très élaboré, les diverses mesures de prophylaxie anti-syphilitique sont étudiées et le tout se termine par certains commentaires de la nouvelle loi dite de prévention des maladies vénériennes votée par l'Assemblée législative de Québec, le 6 mars 1941, et par des considérations sur les mesures actuelles pour enrayer le fléau de la syphilis; loi et mesures de prévention qui feront, espère-t-on, que d'ici quelques années, la situation, au point de vue syphilitique, fera partie intégrante d'un ordre nouveau qui transformera beaucoup de choses.

LA SYPHILIS CHEZ LES ALIÉNÉS.—S. Caron et C. A. Martin.

Statistique des syphilitiques admis à la Clinique Roy-Rousseau, hôpital neuro-psychiatrique de l'Université Laval pour une période de onze ans, allant du 1er janvier 1930 au 1er janvier 1941.

1° *Circonstances étiologiques.*—(a) Fréquence: sur 7678 entrées, nous avons eu 517 entrées de syphilitiques. Moins les réadmissions, il s'agit de 365 individus vérolés. (b) Sexe: 261 hommes contre 104 femmes. (c) Répartition démographique: la syphilis est une maladie de citadins; elle est rare dans les régions rurales. (d) Profession: la syphilis est une maladie de la classe moyenne, des gens qui changent souvent de domicile. (e) La contamination conjugale est relativement rare chez nos malades. (f) Antécédents: antécédents psychopathiques familiaux reconnus chez une cinquantaine de ces 365 avariés. Cinquante-huit sont des alcooliques notoires. Les traumatismes crâniens ne semblent pas intervenir.

2° *Nosographie.*—Paralysie générale (associée ou non), 240; tabès, 24; myélite transverse, 4; artérite syphilitique, 9; hérédo (avec B.W. positif), 21; syphilis secondaire, 66; syphilis primaire, 1.

Nous rencontrons fréquemment d'autres syndromes neurologiques chez nos P.G.; tabès associé, 18; épilepsie, 21; accidents hémiplegiques, 18; vertige, 1; névrite optique, 6. De même chez les hérédos: P.G. juvénile, 4; épilepsie, 5; hémiplegie, 2; arriérés mentaux, 7.

3°—ÉVOLUTION ET TRAITEMENT

Evolution des malades	Formes de syphilis							Total
	P.G.	Tabès	Myélite	Artérite	Hérédo	S. Second	S. Prim.	
Décédés....	31	1	1	3	..	5	..	41
Internés....	121	1	..	1	7	11	..	141
Libérés.....	86	21	3	5	14	50	1	180
Sous-traitement.	2	1	..	..	..	..	..	3
Total....	240	24	4	9	21	66	1	365

Des 86 paralytiques généraux libérés, une quarantaine restent diminués mentalement.

Du nombre total la moitié ont été libérés.

QUELQUES ASPECTS DE LA SYPHILIS INFANTILE.—Marcel Langlois.

La syphilis infantile présente trop d'aspects de par la multiplicité de ses contacts avec l'armature de la société contemporaine pour pouvoir tous les envisager. Les trois principaux aspects qui intéressent le médecin, sont l'aspect diagnostique, thérapeutique et social.

L'aspect diagnostique pose des ambiguïtés surtout en matière de syphilis héréditaire, tant est grand son polymorphisme et l'inconstance des réactions sérologiques. Cependant, son retentissement sur la descendance force le médecin à y penser très souvent.

La thérapeutique demande à être confiée à des mains habituées, car dans ce domaine, il n'y a pas de place pour l'à peu près.

L'aspect social, né des deux précédents et de l'expansion même de la maladie devient prédominant. Il est à souhaiter que tout l'effort actuel, si diffus et disséminé, soit centralisé en vue d'une unification plus pratique et plus efficace.

The Saint John Medical Society

The monthly meeting of the Saint John Medical Society was held as usual, in the Admiral Beatty Hotel. Dr. A. D. Gibbon read a paper on, "The use of vitamins in infancy and childhood". Dr. Gibbon reviewed the literature up to date and added clinical data from his own practice to illustrate points gleaned from recent articles. There was a large attendance and a number of satisfactory discussions.

The Upper Island Medical Association

The Upper Island Medical Association held its Annual Meeting on October 29, 1941, at Parksville, B.C. A clinical and business program, with interludes of golf and other entertainment provided a most enjoyable and profitable day for the members attending.

Following dinner a business meeting was held and the newly elected officers were as follows: Dr. T. L. Briggs, of Courtenay, *President*; Dr. E. N. East, of Qualicum, *Vice-President*; Dr. G. K. MacNaughton, of Cumberland, *Honorary Secretary*; Dr. R. W. Garner, of Port Alberni, *Representative to Board of Directors of the British Columbia Medical Association*; Dr. A. H. Meneely of Nanaimo, *Reporter*.

Dr. M. W. Thomas, Executive Secretary of the College of Physicians and Surgeons, addressed the meeting briefly, and an excellent clinical meeting was given by Dr. Lee Smith, of Vancouver, who spoke on "Genito-urinary conditions in general practice", and Dr. J. R. Neilson, whose paper was "Biliary tract disease, medical and surgical".

Special Correspondence

The London Letter

(From our own correspondent)

Wartime medicine.—One of the earliest medical problems of the war (if the bed-wetting of evacuated children be excepted) was that of peptic ulcer among the forces. Various investigations have been made and certain conclusions drawn. A recent survey of over 800 cases in a military hospital by Major C. A. Hinds Howell is of interest in that certain members of overseas units were included. It was found that peptic ulceration was present in 52.7 per cent of all cases, being spread almost equally between reservists and those called up under various classes, but was rare in the regulars. Of Canadian patients, 50 per cent developed symptoms after arriving in this country. In the British cases the highest age incidence was between 20 and 30 and of these 35 had acute hæmorrhage, 34 had perforated and 29 had had a laparotomy performed. Vomiting was far commoner in soldiers than in civilians, but neurotic dyspepsia was not particularly common. Major Hinds Howell does not enter into speculation as to causation, but other workers have suggested that irregular meals and possibly the cooking of food under active conditions of service may be responsible.

Of the problems presented by air raids that of the blast effects on the lung has attracted much interest. It is difficult to differentiate between the effects of blast and crushing of the chest due to falling masonry but in an incident in which certain huts were demolished the latter factor was absent. A number of cases of "blast lung" have been reported. The main symptoms were grave shock, prostration, restlessness, respiratory difficulty and pain in the chest. The principal physical signs were bulging of the chest wall, congestion and consolidation of the lungs, and bronchopneumonia was a common sequel. Treatment consists of rest, morphine, oxygen and plasma transfusion with chemotherapy as soon as the patient has recovered a little. Drs. J. N. O'Reilly and S. R. Gloyne are responsible for this interesting report.

The future.—While we get on with the job of the present we are all concerned with the future, and all sorts of commissions and committees are investigating the problem and mak-

ing suggestions. Of these the Medical Planning Commission set up by the British Medical Association is the most important, and while nothing official has so far leaked out there have been suggestions in the popular press that the proposals at present finding favour will be concerned with "group medicine", whereby small firms of practitioners will be set up as public companies complete with pathological and radiological facilities. Meanwhile the dentists have been talking over their future too, or at least dental students. It has been pointed out that in general care of the nation's teeth is not in a satisfactory state. About 13 million of the population are covered by the insurance dental benefit and about 6 million school children are covered by the school dental services, but this leaves 24 million for whom there is no state provision, and if it is argued that these folk must be left to the private practitioners of dentistry then the joint committee of dental students representing five London hospitals would reply that the public status of the dental practitioner is deplorably low and only a comparatively small proportion of the population can afford to pay the full fees of private dentists.

Nursing has also been in the news with the usual ignorance of the actual conditions displayed on all sides. The Royal College of Nursing has taken a hand and it is announced that it has set up a committee under the chairmanship of Lord Horder to consider primarily some of the recommendations made by the Inter-departmental Committee on Nursing Services, of which Lord Athlone was chairman. The R.C.N. committee will also plan for the future and in the meantime has got down to work with a sub-committee on an urgent matter, namely, the control of the "assistant nurse" a problem brought to the fore by the employment of various auxiliary nurses during the war.

Nutrition.—Food has a greater interest for us than ever before and it is of great importance to learn that even allowing for the fact that certain experts told us before the war how poor was our general standard of nutrition things are on the whole no worse after two years of war and in some respects better. Judging that the children in rural areas might be expected to show early signs of a deterioration a survey has been made of a group of nearly 500, the examinations being made by the same observer in December, 1939, before rationing was started and again in April, 1941. The conclusion is reached that there was no sign of increasing nutritional deficiency and no deterioration in the state of nutrition. As a further effort to use the war-time interests to better the nation's health there is the welcome news of the foundation of a Nutrition Society under the chairmanship of Sir John Orr, who has already done so much to startle us out of any complacency on the matter of the nation's diet. This new society, which contains representatives of medi-

cine, veterinary surgery, food research, biochemistry and the agricultural and dairy worlds is to hold its first meeting shortly in Cambridge and it is hoped to give some account of the proceeding in the next of these letters.

Chemotherapy.—Meanwhile research keeps its flags flying and more work on the modern developments of chemotherapy proceeds at great pace. In a recent issue of the *British Medical Journal* pride of place is given to reports on the value of a new derivative—sulfanilylguanidine—in the treatment of dysentery, and also on a new sulfonamide of low toxicity, full activity against *B. coli*, hæmolytic streptococci and meningococci, and freely soluble in water. This is named “sulfonamide E.O.S.” so that some more letters will have to be added to the therapeutic dictionary of abbreviations.

ALAN MONCRIEFF.

London, October, 1941.

University Notes

University of Toronto

Further announcement has been made regarding the Department of Physical and Health Education in the University of Toronto. Dr. E. S. Ryerson has been appointed head of the department with the rank of Professor of Health Education. He will be assisted by Dr. H. A. Cates and Dr. A. W. Ham, as Associate Professors of Functional Anatomy, Dr. D. Y. Solandt as Associate Professor of Applied Physiology, and Dr. R. E. Haist, Assistant Professor of Applied Physiology.

J. H. ELLIOTT

Abstracts from Current Literature

Medicine

Gastric Mucosa of Chronic Alcoholic Addicts.

Gray, C. et Schindler, U.: *J. Am. M. Ass.*, 1941, 117: 1105.

Les conclusions de cette étude gastroscopique sont les suivantes: sur 100 alcooliques ayant consommé en moyenne 2.8 chopines d'alcool tous les jours, pendant au delà de 20 ans, la muqueuse gastrique s'est montrée normale dans 55 pour cent des cas; 45 pour cent ont présenté des lésions de gastrite superficielle, gastrite atrophique ou mélange des deux; 22 pour cent présentèrent des hémorragies de la muqueuse; 60 pour cent présentèrent des symptômes variables de gastrite, et 7 pour cent de ces alcooliques avec un estomac normal, ne présentèrent aucun symptôme.

Les auteurs concluent en faisant remarquer qu'ils n'ont observé aucune relation entre l'in-

cidence et la sévérité de la gastrite et la durée de l'alcoolisme, la quantité d'alcool consommée, l'abus de tabac, l'infection dentaire ou la carence vitaminique.

YVES CHAPUT

Surgery

Die Serumbehandlung bei Peritonitis. Bohmansson, G. and Nourp, E.: *Acta Chir. Scand.*, 1941, 84: 427.

During the period 1929 to 1938 3,797 cases of gangrenous appendicitis were investigated; 626 of these had perforated; 210 had diffuse septic peritonitis. The mortality prior to use of large doses of serum and large doses of sulfonamides was 40 per cent; since these two measures have been instituted the mortality has dropped to 6.3 per cent. The serum has been administered during the operation after swab examination with subsequent culture. Anaphylactic shock has been rare, whether general or spinal anæsthesia has been used.

FRANK DORRANCE

Chronic Malignant Granulocytopenia Treated with Splenectomy. Recovery. Nordenson, N. G. and Roden, S.: *Acta Chir. Scand.*, 1941, 84: 519.

The patient had been treated for polyarthritis by tonsillectomy and amidopyrine with physical therapy. In 1936 the above diagnosis was made from bone marrow examination; in 1940 tracheotomy had to be done, with splenectomy two months later. In 14 days sternal puncture revealed a normal bone marrow.

FRANK DORRANCE

Septic Spondylitis. Holmberg, L.: *Acta Chir. Scand.*, 1941, 84: 481.

The detailed histories of 7 cases are added to the 400 already reported since the recognition of the condition in 1879. About 2 per cent of septic osteomyelitis occur in the spine, whilst 25 per cent of tuberculous osteomyelitis are found there. It is believed the red bone of the spine elaborates some protective substance preventing growth of the pyogenic organisms. In this series 5 showed staphylococcus, one streptococcus and one a-bacterial, probably influenzal. All were believed secondary to infection elsewhere. Preceding trauma was present in 4; the onset was rapid and febrile in all; the arches or processes were affected as frequently as the bodies; there was rapid spread to other parts of the same or to other vertebræ and a marked tendency to destruction of the intervertebral discs; abscesses were common, penetrating in any direction and not so likely to follow tissue planes. This form of osteomyelitis occurs as often with adults as with adolescents. The treatment is relief of tension by incision and by immobilization of trunk either by traction or plaster bed. The duration anywhere from 2 months to years with tendency to relapse. Prognosis is partial disability due to spinal rigidity.

FRANK DORRANCE

Diverticular Inguinal Hernia. (Hernie inguinale diverticulée). Burton, C. C. and Blotner, C.: *Surg., Gyn. & Obst.*, 1941, 73: 213.

Sans doute à cause de leur rareté, les hernies inguinales diverticulées ne sont pas toujours l'objet de l'attention qu'elles méritent. On les trouve pourtant mêlées aux cas de récidives, dans la proportion de 13.8 pour cent dans une série de 130 cas soumis par les auteurs dont l'analyse permet de déterminer les caractères particuliers.

Suivent des aperçus généraux justifiant une incidence aussi élevée, et des précisions terminologiques concernant l'emploi du diverticule du sac herniaire comme base de classification des hernies inguinales. Une hernie diverticulée, telle que définie par les auteurs est une petite protrusion du péritoine en forme de poire ou de saucisse, entourée de graisse à l'occasion, qui sort par une fente du *fascia transversalis*. Ces poches extérieures du péritoine sont généralement vides, sauf quelques unes qui sont remplies uniquement de lobules adipeux. La longueur des diverticules est d'environ 3 ou 4 cm. La cause exacte de leur production n'est pas connue. Entre autres avis, les auteurs suggèrent l'idée d'une pression interne brusque, autrement dit, ils attribuent à une "pulsion traumatique" la formation des hernies diverticulées.

Ils classent ces hernies diverticulées en: communicantes, non communicantes, lipomateuses ou adipeuses. Les communicantes et non communicantes ont une structure identique avec pour seule différence dans les secondes la disparition de l'orifice du diverticule remplacé par un diverticule oval, fermé et vide. Un diverticule adipeux est une masse sphérique, irréductible, de consistance élastique, contenant des milliers de lobules adipeux, qui sort à travers une déchirure du *fascia transversalis* dans le triangle inguinal. Il n'est pas relié au sac ni au péritoine. Un diagnostic certain de hernie diverticulée ne peut être fait avant l'opération. Toutefois certains signes cliniques fournissent des indices assez forts pour indiquer qu'il s'agit d'une hernie diverticulée. D'autre part, une hernie diverticulée existe rarement seule.

Les procédés opératoires, dans le cas de hernies diverticulées, varient de la simple excision à l'hernioplastie la plus radicale. Lorsque les procédés de routine sont employés, la durée de la réparation varie de 3 mois à 5 ans.

PIERRE SMITH

Mortality Factors in the Surgical Treatment of Ulcerative Colitis. Cave, H. W. and Thompson, J.: *Ann. Surg.*, 1941, 114: 46.

Afin de diminuer la mortalité au cours du traitement chirurgical de la colite ulcéreuse, les auteurs insistent sur un examen médical prolongé, complet et méticuleux de ces malades.

Avant d'entreprendre toute chirurgie, il faut remédier aux états pathologiques suivants: 1°—

Allergie alimentaire: chez 50 pour cent de ces malades l'allergie alimentaire joue un rôle considérable. La plupart sont sensibilisés au lait, aux œufs, ou au blé. Ils bénéficient en général beaucoup mieux d'une diète riche en protéine, plutôt qu'en hydrate de carbone. 2°—La physiologie gastro-intestinale de ces malades doit être étudiée et corrigée: l'achlorhydrie gastrique produit la diarrhée; l'hypotonie colique avec stase droite contribue à exagérer la douleur. 3°—Les carences alimentaires et vitaminiques doivent être corrigées: protéine, vitamines A, C, et D et complexe vitaminique B. 4°—L'anémie doit être traitée. 5°—Les troubles du métabolisme, du calcium, du phosphore et du chlorure de sodium doivent être étudiés. 6°—L'état général doit être remonté.

Comme autre facteur susceptible de réduire la mortalité, il faut retenir que souvent les malades sont opérés trop tardivement. Et les auteurs terminent cette étude intéressante en rapportant une statistique qui montre nettement que l'iléostomie est accompagnée d'une mortalité plus élevée qu'avec les autres interventions telle que la colectomie sub-totale ou totale.

En tout dernier lieu, au cours d'une discussion suscitée par cet article, le docteur Harvey B. Stone de Baltimore rapportant son expérience avec la sulfaguanidine, est d'opinion que jusqu'à date ce médicament n'a pas de valeur spécifique dans le traitement de cette maladie, mais il croit que ce nouveau-venu pourra contribuer à diminuer de nouveau la mortalité post-opératoire de la colite ulcéreuse. L'expérience ultérieure démontrera le bien-fondé de cette proposition.

YVES CHAPUT

Obstetrics and Gynecology

Instillations of Intestinal and Vaginal Trichomonads into the Human Vagina. Feo, L. G., Rakoff, A. E. and Stobler, R. M.: *Am. J. Obst. & Gyn.*, 1941, 42: 276.

Evidence from experiments presented indicates that the intestinal *trichomonad* (*T. hominis*) is unable to establish itself in the human vagina, even under conditions which are favorable to *T. vaginalis*.

Such results are of considerable clinical significance in that they indicate that contamination from the rectum is not a means by which vaginal trichomoniasis is acquired, as previously claimed. The results also constitute further evidence of specific difference between *T. hominis* and *T. vaginalis*. The facile implantation of *T. vaginalis* from one patient to another, as shown here, is important, especially in view of the reported difficulty of producing similar infestations from pure cultures of the organism.

The characteristic symptoms and signs, frequently described as those of a trichomonas vaginitis, developed in only two patients after direct transmission. Others have reported a

higher incidence in the occurrence of these characteristic manifestations. ROSS MITCHELL

Adenocarcinoma of the Vulva. McDonald, J. R., Lovelady, S. B. and Waugh, J. M.: *Am. J. Obst. & Gyn.*, 1941, 42: 304.

Thirty-two adenocarcinomas of the vulva have been described. Of these, thirty were papillary carcinomas which originated from the apocrine sweat glands in this location; one was a non-papillary adenocarcinoma; and one an adenocarcinoma of the cylindroma type. The papillary carcinomas did not show a tendency to metastasize and were cured by simple excision.

ROSS MITCHELL

Studies of the Post-partum Bladder. Bennetts, F. A. and Judd, G. E.: *Am. J. Obst. & Gyn.*, 1941, 42: 419.

Cystoscopic examination of 116 post-partum bladders revealed general relaxation and minor degrees of mucosal oedema. Ecchymosis of bladder mucosa was present to a minor degree in 12 per cent of the cases, and to a moderate degree in 4.3 per cent of the cases. This was not increased by breech extraction, nor was it seen in two cases of mid forceps, one case of version and extraction and one low cervical Caesarean section.

Cystometric studies revealed hypotonic bladders with decreased bladder sensation and increased capacity in 86.2 per cent of the entire series. Types of delivery, trauma and pre-partum analgesia do not account for this dysfunction. A plea is made for attention to relief of overdistension of the post-partum bladder.

ROSS MITCHELL

The Significance of the Isolation of Histamine from the Urine in the Toxæmia of Pregnancy. Kapeller-Adler, R.: *J. Obst. & Gyn. of Brit. Emp.*, 1941, 48: 155.

The decreased blood-pressure in cases of hyperemesis gravidarum is in accord with the known effect of histamine in lowering the blood-pressure, whereas the hypertension characteristic of pre-eclamptic toxæmia appears at first glance to be at variance with it. It may, however, be recalled that histamine causes renal impairment and persistent albuminuria is mostly observed together with hypertension in cases of severe pre-eclamptic toxæmia. Since serious renal disturbances such as glomerular and tubular lesions follow histamine injections, it appears likely that the primary cause of hypertension in pre-eclamptic toxæmia may be renal impairment. This being granted, the rise in blood-pressure may occur as a protective measure, since it would seem to indicate an attempt on the part of the organism to maintain an adequate filtration pressure in the glomeruli. Thus hypertension in pregnancy may provide by its early appearance, a very important warning sign indicating the activity of histamine in the pregnant body.

In this connection reference may be made to a paper of Walther, who claims striking results from administering injections of histidine in various cases of vomiting and gastric disturbances in pregnancy. The gastric troubles, heartburn and vomiting, disappeared very quickly under that treatment. P. J. KEARNS

An Evaluation of the Treatment of Albuminuria of Pregnancy by the Water-balance Method, Assuming the Theory of Water Intoxication in Pregnancy. Wilson, J. StG.: *J. Obst. & Gyn. of Brit. Emp.*, 1941, 48: 161.

The treatment of albuminuria of pregnancy as carried out in the obstetric clinic in Walton Hospital, Liverpool, is described. During a period of 5 years 905 patients suffering from all types of albuminuria except the hyperemesis of early pregnancy were treated and particulars of 859 patients who were delivered in the clinic are herein collected and tabulated.

In 859 patients there were 8 maternal deaths, with 113 still births and 45 neonatal deaths. There were 63 cases of eclampsia with 2 maternal deaths. Induction of abortion or labour was practised on account of symptoms in 92 patients and abdominal hysterectomy with sterilization in 1 patient.

Cæsarean section was performed in 8 cases during labour for some obstetric indication.

P. J. KEARNS

Analgesia and Anæsthesia in Obstetrics. Griffith, H. R. and Goodall, J. R.: *J. Obst. & Gyn. of Brit. Emp.*, 1941, 48: 323.

The authors state that all general anæsthetics, except cyclopropane, have a depressing effect upon uterine contractions and retraction, proportionate to the degree of anæsthesia produced and to the duration of that degree of anæsthesia. Intermittent anæsthesia with each pain produces, therefore, a minimum of change in the character of labour pains. This is the ideal in normal uterine action. In the expulsive state of the second stage the anæsthetic may be used to the degree of almost complete suppression of the pains, and labour may be completed by hand compression, by episiotomy, or by the forceps, without the assistance of pains. But general anæsthetics vary in their property of suppressing labour pains. It is believed by the authors that they vary in this respect in the following order: cyclopropane, nitrous oxide, ether, and chloroform. This, however, is not the order of their anæsthetic properties.

For the relief of pain during the second stage of labour nitrous oxide is most satisfactory.

For delivery of the baby, either spontaneously or by the forceps, nitrous oxide is not very satisfactory. It does not afford sufficient relaxation, unless the oxygen supply is dangerously reduced, and a too violent expulsion of the baby or uncontrollable excitement of the mother may result. For this reason it is best to change to

cyclopropane as soon as delivery is imminent. This anæsthetic gas provides adequate muscular relaxation, allowing at the same time a large amount of oxygen to both mother and baby, and does not affect the tone of the uterus. It is less toxic than chloroform or ether and more controllable.

P. J. KEARNS

Oto-rhino-laryngology

Incidence of Atrophy of the Olfactory Nerves in Man. Smith, C. G.: *Arch. Otolaryngol.* 1941, 34: 533.

Serial sections of 163 olfactory bulbs from human adults of unspecified age and sex, collected by the Department of Anatomy of the University of Toronto, show that atrophy of the olfactory nerves is common. Since the glomerulus of the bulb disappears when all the olfactory fibres terminating in it have degenerated, the number of fibres reaching a bulb was estimated from the total number of glomeruli present. Bulbs containing 10,000 or more glomeruli were considered to be normal; 55 per cent of the bulbs had lost more than 3/5ths of their complement of olfactory nerves and 13 per cent had lost all their nerves. In only 29 bulbs was the normal number present. Partial atrophy of olfactory nerves may occur throughout a bulb, or be limited to the ends. The fibres passing to the middle survive longest. On the whole, atrophy was evenly balanced on the two sides of the nose, but in individual cases the sides occasionally showed considerable difference. Destruction of olfactory cells of the nasal mucosa by inflammation is regarded as the cause of this atrophy. Functional impairment is not as marked as would be expected from these morphological studies.

C. C. MACKLIN

Primary Tuberculous Complex of the Middle Ear. Baar, H. S. and Evans, R.: *J. Laryngol. & Otol.*, 1941, 56: 159.

Primary tuberculous otitis media is defined by the authors as the site of first infection with tubercle bacilli leading to anatomical changes corresponding to the well established findings resulting from first tuberculous infection in the usual locations. The anatomical changes considered typical of primary tuberculosis are those described by Ghon. That is a homogeneous caseous area with enlarged completely caseated regional lymph glands. In the middle ear the associated regional lymph glands affected are the lateral retropharyngeal, deep superior cervical, anterior auricular and posterior auricular nodes.

By these criteria only 12 cases apart from those of the Lubeck tragedy have been described. The authors present a thirteenth which with the twenty-one from Lubeck makes in all 34 cases. This is the first case ever reported from England, and is described in detail. From a review of their own and the other published cases the authors reach the following conclusions.

That primary tuberculosis of the ear is clinically diagnosable. The syndrome is: (1) age must be less than six months; (2) involvement of the cervical lymph nodes must occur simultaneously with the otorrhœa; (3) a positive tuberculin test must be present; (4) the usual signs of middle ear involvement in a child of that age. The prognosis is considered bad, none of the above cases having recovered. The authors' suggested treatment is operation. They believe a radical operation on the temporal bone and excision of the glands offers the most hope.

GUY H. FISK

Pathology and Experimental Medicine

Further Observations on Skin Reactions to Antigens from Heterologous Cestodes in Echinococcus Disease. Culbertson, J. T. and Rose, M.: *J. Clin. Investigation*, 1941, 20: 249.

Antigens suitable for eliciting skin reactions in patients with echinococcus disease can be derived from many different cestodes, including (in addition to the specific larval parasite *Echinococcus granulosus*) *Tænia serrata*, *Tænia saginata*, *Tænia crassicolis*, *Hymenolepis fraternæ*, *Moniezia expansa*, *Railletina cesticillus*, and the adult sparganum of *Diphyllbothrium mansonoides*.

These antigens will also elicit skin reactions in normal persons locally sensitized passively with the sera from patients with echinococcus disease.

S. R. TOWNSEND

Angiomatosis Retinæ. Staz, L.: *Brit. J. Ophthalmol.*, 1941, 25: 167.

This condition, often accompanied by tumours, particularly of the cerebellum, is relatively rare, less than 200 cases, approximately, having been reported. This article records the occurrence in a woman of 43 and her three children. Her eldest son of 22 refused examination, but had all the symptoms seen in the other members of the family. The 19 year old daughter and the 18 year old son were definitely affected. The mother was one of twins, her twin sister died at the age of 4 months of convulsions. This is of interest in view of the association of brain angiomata with retinal tumours. This is evidently the same family as the one reported by Kaye in the *Archives of Ophthalmology*, 1941, 25: 443, both families being in South Africa, and the data being the same in the two cases.

MADGE THURLOW MACKLIN

Heredity of Pseudo-hypertrophic Muscular Dystrophy. Polachek, W. S.: *Am. J. Dis. Children*, 1941, 61: 1251.

Many families in which there has been a history of pseudo-hypertrophic muscular dystrophy give evidence that the mode of transmission of the hereditary factor is of the sex-linked recessive type.

sive type; that is, it behaves as does hæmophilia, affecting the males and being transmitted to them by their unaffected mothers. The family reported here shows this mode of inheritance. In a family of 7 girls and 5 boys, 4 of the boys died of the disease at the ages of 17, 14, 12 and 10. Of the 7 daughters, 4 showed that they too had inherited the trait for the disease as their sons were affected. One daughter had three sons who died of it at 12, 12 and 15. Two daughters each had one of their sons affected, both were living at the ages of 10 and 15 respectively. The fourth daughter in the original family had one boy affected. One of her daughters has two sons aged 5 and 3, who have as yet not shown any signs of the trouble. Thus of 33 persons in three generations of this family, there were 16 males of whom 10 had the disease, and 17 females, of whom 7 have married. Of these seven 4 have shown that they have carried the gene for the disease. This is in accordance with what one would expect of a sex-linked recessive disease. In this family, as in most of them, the age of death is before 20 years.

MADGE THURLOW MACKLIN

Radiology and Physiotherapy

The Value of Co-operation Between the Radiologist and the Gastroscopist. Davidson, S. W. and Rose, J. D.: *Brit. J. Radiol.*, 1941, 24: 307.

The authors are in entire agreement with Henning that no gastric investigation is complete without a gastroscopic examination.

One of the writers has performed 600 gastroscopic investigations, and in 256 cases there was also a radiological examination. In thirty-nine cases the radiologist returned a diagnosis of suspected carcinoma, which was subsequently confirmed gastroscopically, but in 37 further cases the diagnosis of suspected or definite carcinoma was refuted. It seems reasonable to assume that the majority of these thirty-seven cases would otherwise have had exploratory laparotomies performed. In seven cases a carcinoma was seen gastroscopically after a negative radiological report. Thirty-nine cases of ulcer reported radiologically were confirmed gastroscopically, but seven were refuted and four cases with negative radiological reports were seen to have ulcers. Two cases of polyps diagnosed radiologically were confirmed gastroscopically, but two not demonstrated radiologically were clearly seen with the gastroscope. In one case a radiological diagnosis of extra-gastric tumour was changed on gastroscopic examination to gastric carcinoma.

The actual healing of an ulcer, i.e., complete epithelization, is only recognized gastroscopically, but for all practical purposes a fairly accurate opinion can be given radiologically.

The early and accurate recognition of primary neoplasm or neoplastic changes in ulcer belong

to the field of gastroscopy. This also applies to the determination of neoplastic changes in polypi and the differentiation between polyposis and gastritis polyposa. When, from the density of the tissues or the inaccessibility of the stomach to palpation, it is not possible to offer a radiological opinion, gastroscopy should be performed.

Until recently it has not been possible to confirm radiological diagnosis of gastritis. Taking the field of gastritis as a whole, it is more accurately recognized by gastroscopy. As a result of co-operation between gastroscopist and radiologist, a much more accurate radiological appreciation of the condition of the mucosa is being developed. It is better to make the radiological investigation prior to the gastroscopy.

R. C. BURR

Hygiene and Public Health

Industrial Exposure to Toxic Chemicals. A Scheme for its Medical Control. Foulger, J. H. and Fleming, A. J.: *J. Am. M. Ass.*, 1941, 117: 831.

Foulger and Fleming believe that more important than anything else in the prevention of industrial diseases is the early recognition of deviations from normality. The study of the industrial environment is not as important in this connection as the study of the individual himself. They further believe that the first effects of exposure to toxic substances are substantially the same no matter what the chemical structure of the material. As a matter of fact, since infectious diseases are essentially manifestations of toxic processes, the earliest signs of these diseases are the same as the earliest signs of industrial intoxications.

The authors recommend frequent examinations in order to detect early signs and since frequent examinations to be practicable must not be time consuming, they have devised a simple routine which will detect early evidences of disease. Their routine consists in recording a few simple symptoms, the blood pressure, the pulse rate and the weight. Fatigability is probably the most important symptom. blood pressure the most important sign. Symptoms depend on the honesty and intelligence of the individual. They cannot be readily expressed in a numerical fashion. Blood pressure and pulse rate can be tabulated and become subject to statistical treatment.

The first signs of exposure to toxic substances are definite changes in the blood pressure and pulse rate. In the experience of the authors the blood pressure remains stable in health and deviations from normal do not occur in more than 6 per cent of a large number of examinations on a given individual. Thus if the blood pressure of an individual is taken 100 times over a period of weeks or months not more than 6 abnormal readings can be considered to fall within a chance expectation. More than 6 ab-

normal readings probably indicate a transient or permanent abnormality. The authors have studied these deviations, using statistical methods, and have prepared a chart from which the statistical probability of a series of deviations from normal can be read directly. For example if in 140 examinations of the blood pressure of an individual 0 to 13 abnormal readings are obtained this may be considered to fall within the range of chance variation, i.e., not to exceed a probability of 1 in 20. If more than 12 and less than 17 abnormal readings are obtained the probability of this being due to chance varies from 1 in 20 to 1 in 1,000. A larger number of abnormal readings decreases the probability that chance is a factor and increases the probability that disease is a factor.

FRANK G. PEDLEY

Convalescent Serum in the Treatment of Poliomyelitis. Silverthorne, N., Hawke, W. A. and Brown, A.: *Canad. Pub. Health J.*, 1941, 32: 410.

Silverthorne *et al.* report on 92 patients seen in the preparalytic stage of poliomyelitis during the 1937 epidemic in Toronto. Half of these patients were given 50 c.c. each of convalescent poliomyelitis serum intramuscularly, the other half received no serum. The incidence of paralysis was the same in the two groups, the mortality was the same. The severity of the paralysis was slightly greater in the untreated cases. The authors conclude that this study indicates that the serum was of no value in preventing paralysis.

FRANK G. PEDLEY

Obituaries

Robert Dawson Rudolf, C.B.E., M.D. (Edin.), F.R.C.P.(Lond.), F.R.C.P.(C), F.R.G.S. Doctor Rudolf died on November 2nd after a short illness. He was born in Pictou, Nova Scotia in 1865. When five years of age he went to England with his parents and resided there. He was educated at the Birkenhead School and at the University of Edinburgh. For a brief period (2 years) before beginning his studies in Edinburgh he returned to Canada and settled at Medicine Hat the then terminus of the Canadian Pacific Railway. His purpose was to take up farming but he abandoned this project and proceeded to Edinburgh, where he graduated in medicine in 1889, with the degree of M.B., C.M. In 1890 he attained the degree of M.D. He became a Fellow of the Royal College of Physicians of London in 1910.

After graduation he was a resident physician in the Edinburgh Royal Infirmary, and in the Hospital for Sick Children in Edinburgh. He pursued post-graduate studies in London, Paris and Berlin. Later he spent five years in India, after which he came to Toronto, to establish his permanent home and to practise his profession.

When war broke out in 1914 Dr. Rudolf immediately enlisted and went overseas with the first contingent, remaining there for five years. He served at first at a base hospital in France but subsequently became consulting physician to the Canadian Forces in England with the rank of Colonel. For his services during the war his Majesty made him a Companion of the British

Empire. Prior to the war and for many years he was an officer in the Governor-General's Body Guard.

At the time of his death he was Emeritus Professor of Therapeutics in the University of Toronto and consulting physician to the Toronto General Hospital and the Hospital for Sick Children. These facts indicate his earlier fields of activity in Academic and Hospital circles. He also held a government position as expert adviser regarding the enforcement of the proprietary and patent medicine act.

Dr. Rudolf was at one time President and Fellow of the American Therapeutic Society and of the Royal Medical Society of Edinburgh. He was a Fellow of the American Association of Physicians and a Fellow of the American Board of Internal Medicine.

He travelled somewhat widely. In his early days he visited the far East and a few years ago he sailed from San Francisco for Australia and New Zealand returning home via the Dutch East Indies, the Suez Canal and England. He was a fellow of the Royal Geographical Society.

He wrote many papers published in various journals. In addition he was the author of a textbook for medical students and young practitioners entitled "The Medical Treatment of Disease". This passed through four editions and a fifth was in contemplation just before his death.

In private life Dr. Rudolf had many friends. There was a charm about his unfailing courtesy and quiet dignity that enlisted devotion and affection. He was a man of strict integrity, possessing a kindness of disposition that appealed to all with whom he came in contact. He was fond of riding, golf, fishing and travel, but in his leisure hours perhaps his most outstanding characteristic was his love for children at all ages. He was ever happy in their midst.

In 1894 he married Rosa Marguerita, daughter of the late J. T. Danson of Grasmere, England, she predeceased him 6 years ago. They had one son and one daughter. The son, Major R. G. Rudolf is on the Canadian Headquarters Staff in England; his wife and two children reside in Toronto. The daughter married Dr. C. Beecher Weld who is professor of physiology at Dalhousie University. They have three children. Dr. Rudolf has a sister, Lady Danson and a brother George residing in England. To his family we tender our heartfelt sympathy.

Dr. E. M. Brundage, Chaplin, Sask., died on October 2, 1941, aged 79. He was born in New Brunswick and graduated from Baltimore Medical College in 1896. He came west in 1910 and practised at Bienfait and Gainsborough for several years.

Dr. Richard Cartwright, of Ottawa, died on October 20, 1941. He was aged 79. A native of Kingston, Dr. Cartwright graduated from Queen's Medical College in 1884 and practised medicine in Rochester, N.Y., for 20 years. He was the son of the late Sir Richard Cartwright and Lady Cartwright.

Dr. Reginald Burton Deane, F.A.C.S., one of Western Canada's leading orthopaedic surgeons, succumbed to a protracted cardiac lesion at his home in Calgary on June 23, 1941. He was born in Yeoville, Somersetshire, England, on July 23, 1870, and was the son of the late Captain Richard Burton Deane and Martha Bidout Deane. The family came to Canada over sixty years ago.

Much of Reginald Deane's youth was spent at the headquarters of the Northwest Mounted Police at Regina, Northwest Territories, where his father was a member of this force. Vivid impressions must have been made on young Deane's impressionable mind in those days of the early 80's. He was sometimes employed in making out reports and in attending to other clerical duties. He was there during the stirring days of the Northwest Rebellion in 1885 and witnessed many of the tragic events concerned with this uprising. He met many of

the notable personages of the west who had much to do with moulding public opinion and who were instrumental in fashioning the course of events in the Northwest Territories.

Their influence probably had much to do with his love of history in later years.

As a young man he had difficulty in deciding on a career whether to become a Thespian, a follower of the Muses or a disciple of Æsculapius. He finally decided to become a physician and entered McGill University in 1894 from which institution he graduated in 1898. Here he came under the influence of such teachers as Shepherd, Stewart, Gardner, Girdwood, Adami, and this influence enhanced an enquiring mind which unto the end remained plastic and receptive. In 1899, Dr. Deane registered with the Northwest Territories Medical Council and began practice of his profession at Maple Creek, N.W.T. Later on he moved to Lethbridge, Alberta, and was associated with the late Dr. F. H. Mewburn. In 1911 he came to Calgary and gradually limited his practice to surgery. In 1919 he went to England and studied this branch at Liverpool, Bristol and London. Returning to Calgary he soon established a reputation in this line of work, and in 1922 was appointed honorary surgeon to the Red Cross Hospital for Crippled Children. No one can value the excellent services Dr. Deane rendered to the children of this Province. He was meticulously careful and methodical in his work and seldom wrong in his diagnosis, yet he was inclined to minimize his own abilities. He was greatly beloved by the children and they had complete confidence in him. He always took an active part in medical affairs and brought to bear on a subject a clear judgment and an analytical mind. His presentation of a surgical paper was illustrated by many well chosen references culled from extensive reading and were always a delight to his audience.

He was a constant reader of good books on many and diverse subjects. Literature, history, science and philosophy were his special delight and many of his books were closely annotated, particularly those which contained gems of truth. These he would carefully relegate to the recesses of his memory's storehouse to be recalled at the opportune time.

Dr. David James Dunn, of Edmonton, Alta., died on July 24, 1941. He was born in 1866 and graduated in medicine from Trinity University in 1893.

Dr. George Wallace Elliott, aged 77, a former member of the Winnipeg Police force, and a graduate of the Manitoba Medical College in 1897, died October 21st, at his home in Vancouver. Dr. Elliott came to Manitoba 58 years ago from Kilkenny, Ireland. In 1898 he became one of the early citizens of the Yukon, and later was a medical immigration officer of the Canadian government at Ellis Island, N.Y., and at Portland, Maine, retiring in 1925. He went to Vancouver four years ago.

Dr. Edgar Rae Frankish, well-known Canadian criminologist whose expert evidence for the Crown aided in the conviction of many major criminals, died on October 23, 1941, after a short illness, in his sixty-third year.

In 1934 he was appointed Provincial Pathologist (Ontario) and given full control over the crime detection laboratory at the Provincial Parliament Buildings.

Dr. Frankish had worked on numerous murder or manslaughter cases during the past 10 years and played an integral part in the solution of many famous cases. He was a graduate of Trinity University (1904).

Dr. William James Harrington, a pioneer and well-known doctor of Dauphin, Man., died suddenly on September 13, 1941, in the Winnipeg General Hospital. He was born in 1873. Graduating from Manitoba Medical College in 1900, he practised continuously in Dauphin. In 1925 he represented that constituency as a member

of the provincial legislative assembly, and he continued his interest in politics as president of the Dauphin Liberal Association. Another interest was sport—football, in college days, curling and golf in later life.

Dr. Gordon Edward Helston, of Toronto, Ont., died on October 14, 1941. He was born in 1900 and a graduate of Toronto University (1922).

Dr. Louis Joseph Loughlin, of Carberry, Man., died in Grace Hospital, Winnipeg, October 31st, aged 40 years.

Born in Carroll, Man., he was educated in Winnipeg schools, and graduated in medicine in 1927 from the University of Manitoba. He practised for the last twelve years in Carberry.

Dr. Alexander Smith McCaig, of Sault Ste. Marie, Ont., died on October 29, 1941. He was born in 1871 and graduated from the University of Toronto (1896).

Dr. Robert Mayrand, of Quebec, titular Professor of Dermatology at Laval University, died on October 7, 1941, aged sixty-four. He was a veteran of the first Great War and held the rank of major.

Dr. Herman H. Moore, of Haileybury, Ont., died on October 20, 1941. The late Dr. Moore, who was about 60 years of age graduated from the University of Toronto in 1907, and practised first in Haileybury. In 1910 he came to the Porcupine, locating first at Pottsville, where he was one of those coming through the 1911 fire. After the fire he moved to Aura Lake (now Schumacher). In 1913 he moved to Timmins and for many years was Hollinger doctor there. He won the greatest popularity and esteem not only for his undoubted skill as a surgeon and doctor but for his high qualities as a gentleman. In 1926 he left Timmins and since had been engaged in practice and hospital work in Old Ontario and in the United States.

Dr. Edward Vincent Murphy, former medical superintendent of the Alexandra Hospital, Montreal, died on October 26, 1941, in his fifty-seventh year.

A native of Fall River, Mass., he received his Arts degree at Holy Cross University, Worcester, Mass., in 1908, later coming to McGill University where he graduated in medicine in 1914. He served for a short time as superintendent of the Children's Memorial Hospital and then accepted an appointment on the staff of the Alexandra Hospital. Illness forced him to retire last April.

During more than 25 years of service with the hospital Dr. Murphy was responsible for many progressive changes, keeping the hospital abreast of the times.

Dr. Allister McDonald Murray, of Toronto, died on October 29, 1941. He was the son of Mr. and Mrs. A. McD. Murray. After practising medicine in Mitchell for a few years, he came to Toronto and was one of the first physicians to open a practice in the Danforth district.

Dr. Léon Octave Noel, of Sherbrooke, Que., died on October 5, 1941, in his eighty-third year. Born in Lotbinière, Que., he was a graduate of Laval University (1883), and practised for nearly 13 years at Scotstown. He then became superintendent of l'Hospice St. Julien at St. Ferdinand d'Halifax, Megantic County.

Dr. Telfer J. Norman, of Vancouver, formerly Deputy Minister of Health for Alberta, died on October 8, 1941.

Dr. Norman, who came from Edmonton in 1921, was born at Stromburg, Ont., and was a graduate of McGill University.

Dr. George M. Stuart, aged fifty-nine, for the past 35 years a resident of Cupar, Saskatchewan, died suddenly on October 28, 1941. Dr. Stuart was born in Huron County, Ontario. He graduated in medicine from Manitoba University in 1906 and shortly after settled at Cupar. He was chairman of the public school board for many years and was also to the fore in all civic activities.

News Items

Alberta

The Council of the College of Physicians and Surgeons of Alberta, met in Edmonton on November 13, 1941. It was the last meeting of the Council for this year.

Nominations have been called for elections in four of the medical constituencies in Alberta, Medicine Hat, Red Deer, Peace River and Edmonton, for the two year term 1942-1943. Nominations must be in by the end of the month when ballots will be sent out to the voters.

The Special Commission appointed under the Cancer Remedy Act of Alberta has been investigating the results of the Koch Cancer Cure but their pronouncement has not yet been made. According to the press reports, people claimed benefits in varied illnesses but no scientific data were produced as evidence, either as to the ailment or end-results.

The Council is still being agitated by difference of opinion between the Workmen's Compensation Board, and the mine contract doctors, who have a full medical contract. The point at issue is, does a full medical contract include the services of a specialist, and if the contract doctor is unable to render such treatment, is he bound to furnish it at his own expense. Physicians consider their contracts as covering only such services as a general practitioner does, or should render.

Recently, several physicians from Saskatchewan have registered in Alberta, coming from the dried out areas. They believe a province with coal, oil and more moisture, being nearer the mountains, offers a better chance to get a living than where they have been.

The special committee of Edmonton physicians in charge of arrangements for the Canadian Medical Association Convention at Jasper, June next, is very busy these days. Every little detail is having attention as it is felt that the Jasper convention must be the greatest convention and the most successful one in the history of the Canadian Medical Association.

Dr. Fred Campbell and Dr. A. E. Archer went via airplane to the meeting of the Executive Committee of the Canadian Medical Association at Ottawa, recently.

G. E. LEARMONTH

British Columbia

The recent election in British Columbia has completely altered the political aspect of things and we may look for repercussions in public health matters. The Honourable G. M. Weir, Minister of Health lost his seat, and in the general political chaos, resulting from the absence of a party with a clear majority, there is no knowing at present who will assume his portfolio. The views of the various parties on such matters as health insurance are so varied and divergent that the future may hold a good many surprises for the medical profession.

A recent court case of considerable interest and importance to the medical profession took place in Vancouver when the defendant was a certain mutual benefit society of a type which is becoming very prevalent and gathering a good deal of business. The plaintiff, a surgeon in Vancouver, had charged his patient for an amount which covered pre-operative diagnosis, surgical treatment and post-operative treatment. The company proposed to pay only for the operation, and the surgeon sued. The presiding judge handed down a decision which allowed as a necessary part of the treatment, not only the actual operation, but the pre-operative and post-operative care, and allowed charges therefor. It is hoped that the text of this judgment may be obtained and published at an early date as it will have considerable bearing on this type of insurance.

The following is the personnel of No. 13 Field Ambulance, R.C.A.M.C.—Lieut.-Col. Roy Mustard, Major C. A. Watson, Capt. J. S. McCannel, Capt. G. L. Stoker, Capt. and Adj. W. M. G. Wilson, Lieut. G. C. Johnston, Lieut. T. K. MacLean. This ambulance corps, now stationed in Ontario, was organized as a unit and left British Columbia last July. It is now fully up to strength and completely ready for any service anywhere, at any time.

Medical men from British Columbia are continuing to join His Majesty's Forces. We note that recent enlistments have been those of Drs. W. M. Toone, Nelson; N. B. Hall, Campbell River; R. N. Dick, Chemainus; T. C. Harold, Ladysmith, and others.

The *Bulletin* War Relief Fund of the Vancouver Medical Association has forwarded a second cheque for \$1,147.50 to Ottawa for transmission to Great Britain. It is hoped that a further remittance will be sent shortly. There is the greatest sympathy amongst medical men for this cause and the commonest expression is one of regret that taxes and other inescapable costs do not permit of larger donations.

Dr. Murray Blair, representative on the Executive Committee of the Canadian Medical Association, and Dr. Wallace Wilson, Chairman of the Committee on Economics of the Canadian Medical Association, were recently in Ottawa on matters connected with the Council of the latter body. They returned a few days ago.

J. H. MACDERMOTT

Manitoba

The first meeting of the Executive Committee of the Manitoba Health Officers' Association which was formed in June, 1941, was held in the Library of the Manitoba Medical College, on November 5th.

The members present were: *President*—Dr. George Clingham, Virden; *First Vice-president*—Dr. M. S. Lougheed, Winnipeg; *Second Vice-president*—Dr. E. S. Bolton, Brandon; *Members at Large*—Drs. H. A. Gordon, Portage La Prairie, and H. V. Waldon, Vita.

A draft of the proposed constitution was considered in detail and prepared for presentation at the next Annual Meeting.

Twenty-one Manitoba Hospitals and two cancer clinics have received the approval of the American College of Surgeons, following the 1941 survey which was concluded October 1st.

The following hospitals were approved: Winnipeg—Central Tuberculosis Clinic Hospital, Children's Hospital, Grace Hospital, King Edward Hospital, King George Hospital, St. Joseph's Hospital, Misericordia Hospital, the Shriner's Hospital for Crippled Children, Victoria Hospital, Winnipeg General Hospital; Brandon—General Hospital and Hospital for Mental Diseases; Ninette—Manitoba Sanatorium; St. Boniface—St. Boniface Hospital and St. Roch's Hospital; St. James—Deer Lodge Hospital; St. Vital—St. Boniface Sanatorium;

Selkirk—Hospital for Mental Diseases; The Pas—Hospital St. Antoine.

The cancer clinics operated by St. Boniface Hospital and the Winnipeg General Hospital were also approved.

At the recent meeting of the St. Agnes Guild of the Children's Hospital, Dr. H. Bruce Chown, acting Superintendent, spoke of the recent poliomyelitis epidemic and its effects. He stated that the hospital was taxed to its capacity and told of tentative plans being made to secure further accommodation. Further building being ruled out until after the war, it was proposed by a board of advisers to take over a wing or ward in the Children's Home, Tuxedo, where the convalescent patients might receive treatment.

Frank W. Horner, Ltd., has donated \$500 to the University, for research in the faculty of Medicine.

Dr. W. Grant Beaton, of Winnipeg, has been appointed Honorary Treasurer of the Manitoba Division of the Canadian Medical Association to succeed the late Dr. S. G. Herbert.

Dr. N. Hjalmarsson, who has practised at Lundar for fifteen years, will practise at Pilot Mound in the future. On October 15th he and his wife were tendered a reception by the people of the district and presentations of parting gifts were made.

Much sympathy is felt for Dr. and Mrs. W. F. Stevenson, of Belmont, whose son was killed recently at the Portage la Prairie training school in a collision between two Tiger Moth practice planes.

On October 14th Winnipeg City Council approved the transfer of the Babies Milk Depot, which has been under the direction of the City Health Department, to the Board of Directors of the Children's Hospital. An annual grant of \$3,000 will be made to the Hospital. This transfer will allow much needed space in the building formerly used by the milk depot for victims still suffering from the effects of infantile paralysis. At the present time there are 28 cases of infantile paralysis at the King George Hospital, and when these patients are released they will require care that can be given only by the Children's Hospital.

Manitoba is honoured in the election of Dean A. T. Mathers, Winnipeg, as president of the Royal College of Physicians and Surgeons of Canada. ROSS MITCHELL

New Brunswick

Dr. C. M. Kelly has just returned from a post-graduate study in orthopaedics at various clinics in New York.

Dr. C. W. McMillan, Chief Medical Officer, Department of Health, announced the formation of a special clinic in Fredericton for the treatment and re-education of paralysis cases, following the polio epidemic. The total number of cases of polio in the Province of New Brunswick is now three hundred and seventy-five. A similar clinic has been functioning at Saint John in the Physical Therapy Department of the Saint John General Hospital. The Provincial Government has supplied the services of two trained physical therapy technicians, who will travel through the province assisting the patients and the physicians in treating the aftermath of this epidemic.

Dr. R. T. Hayes, Saint John, attended the Academy of Ophthalmology and Laryngology recently at Chicago.

The meeting of the Royal Canadian College of Physicians and Surgeons at Ottawa was attended by Dr. L. DeV. Chipman, Dr. R. J. Collins, Dr. Geo. Skinner, and Dr. G. A. B. Addy from New Brunswick.

Dr. Geo. White, of Saint John, attended the meeting of the Canadian Gynaecological Society in Toronto, and went from there to the American College of Surgeons' meeting in Boston. A good number of surgeons from New Brunswick took in this latter meeting.

Dr. L. DeV. Chipman, Provincial President of the Red Cross Society, is busy organizing a Blood Donor Clinic to be centred in the larger towns of New Brunswick. Arrangements have been made for the laboratory work to be done at Fredericton.

Due to increased usage of the Provincial Laboratories and an extension of work in its various departments, it has become necessary to transfer the main Serum Depot from the Saint John Hospital to the Health Centre, Saint John.

Lieutenant James Squire, R.C.A.M.C., in Active Army has received his captaincy. A. STANLEY KIRKLAND

Nova Scotia

Approved by the American College of Surgeons are these Nova Scotian hospitals: Camp Hill Hospital, Halifax Infirmary, Children's, the Grace Maternity, Tuberculosis Hospital, Victoria General Hospital, Halifax; Nova Scotia Sanatorium, Kentville; St. Martha's, Antigonish; Nova Scotia Hospital, Dartmouth; Glace Bay General, St. Joseph's, Glace Bay; Aberdeen Hospital, New Glasgow; New Waterford General Hospital; Hamilton Memorial, North Sydney; City of Sydney Hospital, St. Rita's, Sydney; Colchester Hospital, Truro; Yarmouth Hospital; Highland View Hospital, Amherst; Harbour View Hospital, Sydney Mines; Eastern Kings Memorial, Wolfville.

The diphtheria bacillus is settling down for another active winter in Halifax, its victims more numerous than for the same period, last year. The extensive toxoiding carried out should be a safeguard against a major epidemic.

The Pictou County Medical Society met at the Aberdeen Hospital and elected as officers for the ensuing year: *President*—Dr. V. H. T. Parker, Stellarton; *Vice-president*—Dr. Stewart Murray, River John; *Secretary-Treasurer*—Dr. C. B. Crummey, Trenton, succeeding the late Dr. John Bell who had held the office for 45 years; *Executive Members*—Drs. Clarence Miller, New Glasgow, and G. A. Dunn, Pictou.

Among those attending the annual meeting of the American College of Surgeons, at Boston, were Drs. L. M. Morton, J. E. LeBlanc, M. G. Tompkins, Alan Curry, J. V. Graham, N. H. Gosse, E. H. Stoddard.

ARTHUR L. MURPHY

Ontario

At a special Convocation of the University of Toronto on October 24th, the honorary degree of Doctor of Laws was conferred upon Dr. Thomas Parran, Surgeon-General of the United States Health Service, upon Dr. Donald Balfour, Director of the Mayo Foundation, Rochester, Minnesota, and founder of the Balfour Lecture at the University of Toronto, and upon Sir William Jameson, Chief Medical Officer of the Ministry of Health of Great Britain. In the evening, Dr. Parran and Sir William gave addresses in Convocation Hall on "Health, nutrition, and national defence".

Following a tuberculin survey among pupils at the Toronto public schools, it has been suggested that members of the school teaching and caretaking staffs who failed to submit themselves voluntarily for these tests, be required to do so. Of 21,723 pupils, the Director of Education said only 2,100 failed to vol-

unteer for the tests which were conducted by the Department of Health. The School Board appeared to have decided that the names of the teachers refusing the test be reported and that these employees be asked to furnish certificates by mid-December at their own expense.

Dr. James M. Mackintosh, formerly Chief Medical Officer for Scotland addressed the Academy of Medicine, Toronto, on November 14th on the subject "War-time problems in medicine". On November 17th he spoke on "A.R.P. and hospital organization in Britain"; to the superintendents and officers of many of the hospitals in the Toronto area, at an informal dinner meeting arranged by Dr. B. T. McGhie as Director of Medical Services of the Civilian Defence Committee (A.R.P.).

The meeting of the New York Academy of Medicine on October 2nd was devoted to the memory of the late Sir Frederick G. Banting. Dr. Charles H. Best, who succeeded Dr. Banting as director of the department of physiology and the department of medical research of the University of Toronto, made a memorial address and a scientific address on "Prevention of diabetes from the experimental viewpoint", and Dr. Elliott P. Joslin, Boston, spoke on the "Use of insulin in its various forms in the treatment of diabetes".

Dr. Henry E. Sigerist, Professor of the History of Medicine, Johns Hopkins University, was one of the guest speakers at the Queen's University celebration of the 100th Anniversary of its foundation. The honorary degree of Doctor of Laws was conferred upon this eminent medical historian. He gave a public address on the subject, "One hundred years of medicine". While in Canada, he visited Ottawa as head of the Russian War Relief Inc. of the United States. He addressed two private gatherings there in which he dealt with war surgery and medicine in Russia as well as Russian advances in socialized medicine. He described the splendid institute for experimental medicine in Moscow which has more than 2,000 students. A similar one had been operating in Kiev, only recently completed. He told of the strongly popular movement which had sprung up in the United States to send not only medical aid, but other help to Russia. In the New York office a staff of fifty persons is already employed, with a first objective, Dr. Sigerist stated, to obtain \$1,000,000 to help to finance the relief gifts.

On Wednesday, November 12th, the Staff of the Hospital for Sick Children, Toronto, tendered a complimentary banquet to Dr. Walter Walker Wright on the occasion of his appointment as Professor of Ophthalmology and Head of the Department in the University of Toronto.

Miss A. E. M. Parkes, commandant of the Toronto Branch of the Canadian Red Cross Corps, has been appointed representative of the University Training Detachments on the Canadian Red Cross Corps Committee. She was in charge of the Canadian Girls' Olympic Team that went to Amsterdam in 1928. She has conducted the first aid and A.R.P. work in the Women's Training Service Detachment at the University.

Dr. John E. Hammett, a graduate of Queen's University (1919), has been appointed professor of surgery and attending surgeon to New York Polyclinic Medical School and Hospital.

Major Kenneth C. Butler, a graduate of Queen's University (1932), who for a number of years served north of the Arctic Circle as a constable in the Royal

Canadian Mounted Police, is second-in-command of the 23rd Field Ambulance, now overseas. Lt.-Col. M. D. Graham, Queen's University (1914), is the officer in charge. J. H. ELLIOTT

Quebec

Plans for the formation in Montreal of a voluntary non-profit hospital service association, which would provide for the hospitalization of groups of employed persons without specific charge on payment of a monthly subscription, were advanced at a meeting with Dr. C. Rufus Rorem, Ph.D., C.P.A., Director of the Hospital Service Plan Commission, American Hospital Association.

These concerned the rates of subscriptions through deduction from payrolls and the period of hospitalization to which subscribers would be entitled, together with the general terms of the contract that would be entered into between the service plan and the city hospitals, for the treatment of such subscribers in semi-private wards. It is expected that as a result of the conference, details will shortly be made public and definite steps taken to establish the plan in Montreal, with the possibility of extending it later throughout the province.

Dr. Rorem addressed a representative gathering of Montrealers who had been invited by George A. Macdonald, C.A., chairman of the organization committee, to meet him.

Dr. Rorem pointed out in his opening remarks that hospital bills could not be paid without money, and that hospitals could not pay their bills without money. The problem of the individual in getting hospitalization was essentially one of removing the uncertainty of cost. Nobody could tell what sickness was going to cost him, but experience had shown what the sickness of a group would cost as statistics established what proportion of that group would need hospitalization within a year. Every family had at least one person in hospital in every five years. The ordinary individual, however, was not able to budget for hospital expenses, and that was the reason why the group plan had been developed.

There were 66 plans operating in the United States, the subscribing membership ranging from 10,000 up to 1,300,000 persons in New York, he said, while there were 10 plans with 300,000 members each or more. The hospital service plan had been operating in Manitoba successfully for many years and in Toronto 15,000 members had been enrolled since the spring.

It was explained by Dr. Rorem that the subscription rates generally ranged from 50 to 85 cents a month for individuals and from \$1 to \$2 where a subscriber's family was also included in the plan.

The period of hospitalization was usually 21 days, including special services, x-ray, nursing, board and semi-private accommodation. Hospitals contracted to supply the service, for which they would get paid at specified rates out of the subscriptions, and at the same time they would be relieved of the cost of caring for a large number of people who were afraid to go to hospitals as private patients, and thus became a charge on charity.

Dr. Rorem said the project must be considered as a community venture of a non-profit character, with free choice of hospitals, and in the interests of the best quality of service and the subscriber's own peace of mind. Early hospitalization reduced the period of illness, and it was estimated that in the United States the 66 plans had saved a million working days a year by their operation. The speaker explained how the plan might be extended to farmers and small town communities and how service clubs might co-operate. He remarked that removal of worry about paying the hospital bill contributed to a patient's recovery and made it easier for his medical man to recommend hospitalization.

In answer to a number of questions the speaker said some people had objection to payroll deductions, but in this case a man would know the deduction was for himself and not for the other fellow. A subscriber could get better accommodation than a semi-private ward by pay-

ing the difference. In most plans there was no age limit, but a subscriber must be an employed person.

Doctors' fees were not included in the hospital service scheme—in some places there was a medical service plan but that was something the initiative of which must come from the medical profession. On an average less than 5 per cent of patients remained in hospital more than 21 days. This was the limit set in many plans, others who made it higher were really window dressing, because it was not used.

In a recent address at the annual convention of the Quebec Union of Municipalities, Dr. Albert Lesage, Dean of the Faculty of Medicine, University of Montreal, stated that the present condition of public health in the Province of Quebec is a menace to the future of the French Canadian people. He quoted from official statistics to show that the live birth-rate in the province had waned in the last decade while the number of marriages had increased considerably.

"So we must cut down our infant mortality rate", he told the municipal officials. "We must do this if we want at least to maintain the present status of our population."

Emphasizing that preventive medicine was "the medicine of the future," he said all the leading causes of infant mortality were avoidable. He listed the principal causes in Quebec as polluted water, contaminated milk and unsanitary utensils.

He told the assembled mayors and aldermen it was their duty and responsibility to ensure the purity of all water used by their citizens.

"Negligence on your part in this matter is a crime, often a fatal one. Frequently ignorance or prejudice lie behind it, but this is inexcusable."

Similarly, the purveying of contaminated milk was a "crime", in view of the achievements of other provinces and countries by use of pasteurization.

Speaking as president of the Canadian Health League, Quebec Division, he appealed to the mayors to join the front ranks in the crusade for pure milk and announced that an "educational campaign on this important question" will be launched soon in Quebec.

"There is no need for our children to die from diphtheria," he said, discussing "another important cause of infant mortality."

"Despite all our efforts, the diphtheria toll is increasing because parents neglect to have their children vaccinated. You mayors must urge your doctors to use the serum distributed without charge to any physician requesting it. We must educate the public."

He said the people of the province were "imbued with prejudices". The doctor was not receiving from the public that constant support which was essential for an effective battle against the "hecatomb" of Quebec's high infant death-rate.

Mayors and aldermen were "in a fine position to influence parents in the right direction", he said, urging them to persuade doctors in their municipalities to help "expose the dangers of prejudice".

Deaths in Quebec from tuberculosis were three times as frequent as in Ontario and municipal officials throughout the province should use their influence to see the present anti-tuberculosis campaign of the Provincial Government did not finish at the end of this year, as scheduled.

Speaking next of the physical condition of young Quebec recruits for the Canadian Army, Dr. Lesage said that "only 57 per cent of those examined in the province were placed in A category".

The pitiful appearance of many of these recruits is often striking. In many cases, poor nutrition coupled with complete lack of regular physical exercise is clearly evident. "When we see these same men after a few months of military training, they have been transformed."

It was the governments today which must assume complete responsibility for public health, instead of yielding slowly to the demands of public opinion, as in the past.

But the average citizen still must play a leading rôle in all social reforms, for their success depended largely on his "whole-hearted co-operation".

Mr. W. F. Angus, chairman of the board of directors of the Montreal Mental Hygiene Institute, has announced the appointment of Baruch Silverman, M.D., C.M., F.A.P.A., as director of the institute, succeeding the late Dr. W. T. B. Mitchell.

Dr. Silverman is a graduate in medicine of McGill University. Following a period of post-graduate study in psychiatry, he returned to Montreal to join the staff of the institute in 1923. From 1925 to 1935 he was on the staff of the Canadian National Committee for Mental Hygiene as research psychiatrist, and, under the direction of Dr. C. M. Hincks, collaborated with a number of psychiatrists and psychologists throughout Canada on research problems related to the field of mental hygiene. This research, which was sponsored by the Rockefeller Institution, was concerned with the recognition, treatment and prevention of early signs of neurotic behaviour and mental disorders in children.

Dr. Silverman is associate psychiatrist to the Royal Victoria Hospital, lecturer in mental hygiene and psychiatry at McGill University, lecturer in social psychiatry at the Montreal School of Social Work and a Fellow of the American Psychiatric and Orthopsychiatric Associations. He has had a long and varied experience in the prevention and treatment of mental disorders.

H. F. Moseley, M.D.(Hon.), M.Ch.(Oxon.), F.R.C.S. (Eng.), received his F.R.C.S.(C) at the annual meeting of the Royal College of Physicians and Surgeons held in Ottawa in October.

Dr. Moseley, a native of Nova Scotia, went overseas as a Rhodes Scholar after two brilliant years of work in medicine at McGill. He returned after completing his medical studies in Great Britain, and is a demonstrator in surgery at McGill and also on the staff of the Royal Victoria Hospital.

Dr. W. W. Chipman, emeritus professor of Gynaecology at McGill University, was guest of honour on October 28th, at a dinner given by 30 of his former pupils now stationed in the Halifax area with the Army, Navy and Air Force. Dr. F. J. Scully, of Montreal, acted as chairman, and Dr. Chipman delivered an address.

Lt.-Col. J. R. Lochead, M.D., reported promoted from the rank of major, was the former medical officer of Victoria Rifles of Canada. He has been on active service since the beginning of the war, serving originally with the Internal Security Force. Later he became medical officer of the District Depot from where he was transferred recently to take command of a military hospital. He was succeeded at the District Depot by Major A. L. Delahaye, M.D.

Col. R. Percy Wright, C.M.G., D.S.O., former officer commanding No. 14 Canadian General Hospital, has been appointed to command the Fort Osborne Military Hospital at Winnipeg, Man., it was announced recently. Well-known in Montreal medical circles and with a distinguished record of service in the Great War, Col. Wright had the misfortune to be taken seriously ill when his unit was ordered overseas early this year.

Another senior officer of the R.C.A.M.C., who has held several important posts here since the beginning of the war, has been appointed to take charge of the medical boards at the military central recruiting office here. He is Lt.-Col. W. W. Ruddick, who formerly served with No. 1 Canadian General Hospital.

Four women doctors, all graduates of McGill University, have been added to the staff of the District Medical Officer of M.D. No. 4, Lt.-Col. R. H. McGibbon, E.D., who will be responsible for the medical examination of recruits for the Canadian Women's Army Corps.



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They are: Dr. Lyla Brown, Dr. Dorothea Mellor of the staff of the Royal Victoria Hospital; Dr. Dorothy Wisenberg a member of the staffs of the Royal Edward Institute and the Jewish General Hospital; and Dr. Leila Golden, until recently on the staff of the Grace Dart Hospital. Three are Montrealers, Miss Wisenberg being a resident of Westmount.

In addition to their duties as medical examiners for the new C.W.A.C. the doctors will also have medical examination of nurses joining the Nursing Sisters' branch of the Royal Canadian Army Medical Corps.

L'association des oto-rhino-laryngologistes de la province de Québec s'est réunie récemment à Québec où elle a tenu une séance scientifique. Des travaux ont été présentés par les Drs P. Panneton, L. de G. Joubert, E. Blain, V. Latraverse, J. Vaillancourt, P. Painchaud, J. Lacerte et E. Pelletier.

Le 28 octobre dernier, le Dr J. L. Riopelle, anatomo-pathologiste à l'Hôtel-Dieu de Montréal a soutenu une thèse d'agrégation sur "Les proliférations nerveuses de la vésicule biliaire au cours des lithiases et des cholécystites". Le 4 novembre, le Dr Paul Poirier du même hôpital soutenait également une thèse d'agrégation sur "Une contribution à l'étude de la grande infection héréditaire."

Le Dr Renaud Lemieux, de Québec, a été nommé à la direction du nouvel hôpital militaire construit sur les Plaines d'Abraham.

A l'hôpital St-Luc de Montréal, le Dr Roméo Grondin a été nommé chef du service d'Electroradiologie; le Dr Eugène Garceau, chef du service de Dermato-syphiligraphie; le Dr Daniel Longpré, chef du service de Pédiatrie.

Le Dr Charles Vézina, de Québec, a été nommé vice-président du Conseil 1941-32 du Collège royal des médecins et chirurgiens du Canada. Le Dr Léon Gérin-Lajoie fut élu membre du conseil, remplaçant le Dr B. G. Bourgeois.

JEAN SAUCIER

Saskatchewan

Dr. A. W. Hotham was honoured with a Thanksgiving party at his home in Strasbourg. He had made his home in Montmartre, Sask., for the past four years, being engaged as municipal doctor there. The first of October he gave up his work there and returned to his home in Strasbourg to enjoy a well-earned rest.

Dr. Hotham came west from Mitchell, Ontario, as a school teacher in the early '90's. He taught the Boggy Creek school, north of Regina, for a time, later returning to the east and completing his medical course at Trinity College. In 1905 he came to Strasbourg to practise. From then on for 25 years the doctor travelled the country from one side to the other, finding no trail too long nor any call too far away. In 1926 he accepted a position on the staff of the mental hospital at North Battleford, remaining there until 1930. Then he practised in Earl Grey for a few years before coming back to Strasbourg.

LILLIAN A. CHASE

General

The Association of Military Surgeons of the United States has elected four Canadian military physicians to honorary membership.

The Canadians honoured are, Surgeon Commander A. McCallum, Director of Medical Service of the Royal Canadian Navy; Dr. Frederick W. Jackson, Deputy Minister of Health of Alberta; and Col. E. G. Davis and Lieut.-Col. W. P. Warner of the Royal Canadian Army Medical Corps.

The addition of a number of drugs to the list of preparations which may not be purchased except on individual prescription from a physician or dentist was disclosed on November 19, 1941, in the Canada Gazette.

A preamble to the order said it was believed by the Pensions and Health Department that the drugs "may result in injury in cases where diagnosis is not made nor prescription given by a properly qualified person."

The drugs are aminopyrin, barbituric acid, beta-mino propylbenzene and its salts, cinchophen and neo-cinchophen, dilantin sodium, orthodinitrophenol and its compounds, sulfanilamide and its salts and its derivatives, and thyroid, thyroxin and its salts.

Book Reviews

Symptoms in Diagnosis. J. C. Meakins. 323 pp., illust. \$4.00. Little, Brown & Co., Boston, 1941.

Certain men should write certain books. Professor Meakins is one of those men, and the volume under review deals with a subject for which he is peculiarly fitted. His long clinical experience has been expressed already in his well known textbook on medicine, but he has something yet to give us. His clinical training has shown him how complex a matter is diagnosis, but instead of insisting on complex methods he has come back to the comparatively simple one of the patient's symptoms. "Symptoms," he reminds us, "are the patient's way of telling his story". And then with his sound commonsense he rebukes us in his characteristic phraseology "They (the patients) as individuals are most of the time rather inaccurate as far as the terms they use are concerned; but, who are we to be too 'choosy' about terms when we are so slovenly about them ourselves? It should be our endeavour sympathetically to encourage the patient to express his feelings in simple language, unadorned by preconceived diagnostic impressions gleaned over the back fence, around the tea table, at a church social or a cocktail party."

The book opens with a chapter on physical characteristics of the body in which growth and weight and normal departures therefrom are dealt with. Then follows a chapter on the skin and allied conditions, with all the rich field of signs and symptoms embraced therein. The following chapters deal with disturbances of sensation with symptoms of localizing value, and those having reference to general function.

It is obviously not a book of reference, but will have its value in acting as a stimulus in analyzing the picture of disease. One finds the author's wide experience throughout: for example, his comment in regard to cough that "as the site of the lesion progresses downwards from the larynx to the bronchioles cough becomes less violent". Or the mention of the fact that coronary arteries are so often markedly atheromatous and narrowed with no history of angina of effort.

Illustrations have been used very wisely. Abnormal conditions are shown in photographs and for the rest diagrams and line drawings speak clearly and adequately.

The book may be highly recommended.

Maude Abbott, a Memoir. H. E. MacDermot. 264 pp., illust. \$2.50. Macmillan, Toronto, 1941.

Maude Abbott was an outstanding character in medicine in Canada. It is doubtful if any member of the Canadian medical profession of her time was so well and so widely known in America and in Europe. Primarily interested in gross and microscopic pathology as a basis for investigation and teaching in medicine and as a sound basis for clinical work, she developed the pathological museum until it became an essential part of clinical instruction, a result due in great part to her activity in the organization of the



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International Association of Medical Museums, of which she was Permanent Secretary 1907-1938 as well as editor of its *Bulletin* and *Journal*.

Successively Fellow and Lecturer in Pathology in McGill University as well as Curator of the Pathological Museum, and with her interest in cardiac anomalies she became the world's outstanding authority on anomalies of the heart, her contributions in papers and textbooks clarifying what had been an obscure subject. Her first contribution brought from Sir William Osler, "far and away the best thing ever written on the subject in English—possibly in any language—of extraordinary merit—for years it will be the standard work on the subject." And for twenty-five years she continued to add to the world's knowledge, culminating in her great *Atlas* which brought from the world's great physicians recognition and praise similar to that written by Osler in 1907.

To editorial and review work she gave much of her energy, and had she received necessary support from those in authority we can believe that as Curator of the Canadian Army Medical Museum she would have given to Canada a collection of immense permanent value.

The story of the most outstanding woman in Canadian medicine is well told by Dr. MacDermot. With access to her diaries, her autobiography, her correspondence and writings, and a long association in editorial work he has given us a delightful volume. Those who knew her well cannot fail to know and understand her better through this sympathetic record of her youth, her student days, her post-graduate years and of her developing greatness. Those who knew her but slightly will be glad to have this full story of her ambitions, her varied activities, of difficulties overcome, of her abounding energy and kindly disposition. To the student in medicine it will be a book to be recommended, for it is filled with the spirit of her hero, Sir William Osler, and his master word in medicine. Dr. MacDermot has taken opportunity to introduce a chapter of historical interest telling of the spade work done in Quebec in securing admission of women into the classes in Arts in McGill University, and of the beginnings of medical education for women in Quebec.

The book is full of human values, and the author is to be congratulated on the handling of the material at his disposal, in making a book at once so comprehensive, so vital, so readable and enjoyable. Her life, full of achievement so delightfully related should be a source of pride to all Canadians, to all members of her profession of medicine, and for the younger generation to emulate.

Epilepsy and Cerebral Localization; a Study of the Mechanism, Treatment and Prevention of Epileptic Seizures. W. Penfield and T. C. Erickson. 623 pp., illust. \$8.00. C. C. Thomas, Springfield, 1941.

Until recent years the student of neurology had to seek much of his information in French and German writings or in translations of these. The number of texts in English has been increasing but there are still many gaps. Thus this book by Penfield and Erickson is welcome and gives to the student a chance to read in the original a good account of the state of our knowledge in one field of neurology and of the efforts that are being made to add to that knowledge.

The printing is creditably done but a reviewer who likes to point to errors as proof that he has actually read a book will find several faults in the proof-reading. Figures have not been used sparingly, but many of these give an unhappy effect because they have been reduced too much in size, making the signs and lettering indistinct.

With the exception of two chapters the book has been written by the authors whose names appear on the title-page. One of these two chapters is on electroencephalography and will serve as a good introduction to the subject for those who wish to know what can be learned from this method of examination; the other chapter, which deals with the psy-

chology of patients with epileptic seizures, is clearer than most writings on psychology and gives rise to the hope that psychologists may yet learn the value of the short word.

Although lacking to some extent the urbanity of most English neurologists, the style of the remainder of the book is lucid, and historical and literary references are made casually enough to show that the scholarship is genuine. The problem of the epileptiform seizure has been approached from almost every angle and the average reader will be startled to find that there are so many of these. The second chapter is possibly the best but to those who enjoy watching the authors keep their balance through a morass of theories, facts and fancies, the fourth chapter will give most pleasure. It is a difficult chapter to read and in comparison with it the other parts of the book are quite straightforward.

A place will naturally be found for the book in institutional medical libraries and the neurologist and neurosurgeon will need it—at least for reference. Its appeal will be greatest to the general practitioner for the diagnosis of cryptogenic epilepsy, its prognosis, its management and the place the epileptic may be allowed to take in industry, for these are among the most difficult things the family physician has to learn. Furthermore the multitudinous number of epileptogenic lesions and the possibilities that seizures can be lessened or removed by neurosurgery are matters of grave concern for the conscientious medical adviser. To those who have to give medical advice to such patients this book will bring much help and sometimes abiding solace.

Fractures. G. Perkins. 384 pp., illust. \$6.00. Mc-Ainsh, Toronto, 1941.

Every surgeon who has occasion to treat a large number of fractures gradually develops favourite methods of his own, and it is consequently impossible to secure universal agreement as to details. At the same time, the younger practitioner is always ready for a short systematic treatise on the subject, which will point out to him principles of treatment, and particulars of the application of these without going into unnecessary points. This is such a book.

It describes the treatment of a fractured bone as consisting of three stages, (1) reduction, (2) fixation, (3) protection until consolidation is complete. Attention is also directed to the important subject of the treatment of the soft parts involved in a fracture. Compound fractures, fractures involving the joints, and complicating factors such as mal-union, delayed union, and non-union are also considered. The causes of non-union are discussed under the headings of "unavoidable" and "avoidable". The latter section is very well summarized. Passing to particular fractures, consideration is given to the skull, first of all, and after that to ribs, and vertebral column. For cervical spine dislocations, the use of skull calipers is recommended. No mention is made of the employment of a bone graft to obviate recurrence of a fracture-dislocation.

The printing of this book is excellent, and few errors were observed. The illustrations are line-drawings, and are models of clearness. The book is one which can be recommended with confidence, especially to students and to those whose practice includes the subject of fractures, without specializing on it.

Clinical and Experimental Investigations of the Genital Functions and their Hormonal Regulation. B. Zondek. 264 pp., illust. \$5.40. University of Toronto Press, Toronto, 1941.

This is a summary of the clinical and experimental investigations that the author has carried out since January, 1935. Nearly half of the book is devoted to a study of the effects of large doses of oestrogenic hormone, particularly in regard to the effect in experimental animals on the pituitary and other glands of internal secretion. The subcutaneous and percutaneous methods of administration of oestrogenic and andro-

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genic hormones are discussed and a few clinical investigations are reported. A chapter on "the clinical investigation concerning the cycle in the female organism" includes the varying effect on menstruation of oestrogen and progesterone given separately and together at different times during the cycle. This chapter, and the last one on the mechanism of menstruation, are the two most likely to interest the clinician. The book, however, is largely devoted to animal experiments and for that reason will have little appeal to practitioners. The specialist in gynaecology who desires to keep abreast of experimental work in the field of sex hormones will find in this monograph 268 references to such work, as well as an excellent summary of the researches of an outstanding investigator in this sphere.

Clinical Aspects of the Electrocardiogram. H. E. Pardee. 4th ed., 434 pp., illust. \$5.75. P. B. Hoeber, New York, 1941.

The title of this book and its contents fit each other admirably. This is an authoritative book on the clinical interpretation of electrocardiograms, and each successive edition has retained its special place among other books on this subject. The present edition effectively sustains the tradition. From his own wide experience and a well balanced, judicious selection of information from the literature on the subject the author presents clear patterns of modern knowledge of the electrocardiogram. The chapter on the normal electrocardiogram makes it clear that the exact limits of normal have yet to be established, and reveals on what meagre data our present "standards" are based. Thus direction is given to a rich field of research. The best chapters are those which deal with the practical problems of correlating what is found in an electrocardiogram with the clinical picture as a whole. Although the frequent reference to measurements and shapes of individual portions of the electrocardiogram makes it difficult to write about this subject, the book is a very "readable" one. The chapter on "Theory and nomenclature" does not devote enough attention to the theories, newer than Einthoven's, which give promise of explaining some baffling phenomena. However, the author may have decided to reserve this for the fifth edition.

Papers of Wade Hampton Frost, M.D. Edited by K. F. Maxcy. 628 pp. Price \$3.00. The Commonwealth Fund, N.Y., 1941.

Wade Hampton Frost was, without doubt, the leading epidemiologist and one of the most influential figures in public health at the time of his death in 1938. This volume tells the story of the evolution of epidemiology during Frost's lifetime, and indicates the part he played. It provides a valuable permanent book of reference. It will serve as an inspiration to all who read it. Frost is so well known to public health workers that it seems superfluous to recommend the book to them, but it is hoped that many of the general medical profession will read this book in order to view disease as it affects the mass of the population and to gain an idea of Frost's social philosophy. Dr. Maxcy has done a fine piece of work as editor.

Abdominal Surgery of Infancy and Childhood. W. E. Ladd and R. E. Gross. 455 pp., illust. \$11.50. McAinsh, Toronto, 1941.

This is an excellent book. Comprehensive yet concise, clear and simply written, no matter how intricate the subject, it is obviously not the result of a painstaking review of the literature but of a vast personal clinical experience, carefully observed, accurately recorded and thoroughly tabulated by authors of broad critical judgment.

The authors' approach to the patient is that of the paediatrician. This is well seen in the explicit instructions, which are considered so important, on how to examine the child's abdomen. Their attitude that the minimum amount of diagnostic investigation to establish

the diagnosis is all that should be done, is also sound. For example, barium drinks and enemata are usually unnecessary in cases of obstruction where a flat plate gives all the necessary information.

Every chapter deserves a review of its own but perhaps sufficient has been said to persuade every surgeon who attempts abdominal surgery in children, not only to buy the book for their shelves, but to study it carefully.

The style is excellent in its clear, brief and simple exposition. Illustrations, tables and diagrams are profuse and can be understood at a glance. Every phase of the subject is covered including anaesthetic of choice, common dangers and pitfalls, pre-operative and post-operative routines.

School Health Services. A study of the programs developed by the health departments in six Tennessee counties. W. F. Walker and C. R. Randolph. 172 pp. \$1.50. The Commonwealth Fund, N.Y., 1941.

A relatively large proportion of public health budgets has been devoted to school health services. For this and other reasons, it is most desirable to have a fair appraisal of the effectiveness of these services and, on the basis of the study, secure ideas as to how they may be improved. The present study has accomplished this purpose, and a valuable contribution has been made to this important subject. The book is well printed and the text is clarified by the use of simple charts. The study will be welcomed by all public health workers, and is recommended to all physicians engaged in school work or, indeed, in any health clinic services.

Pathology of the Oral Cavity. L. R. Cahn. 240 pp., illust. \$6.60. University of Toronto Press, 1941.

To the average general practitioner, whether medical or dental, the effort to refresh his knowledge of the basic sciences is too great and his time too limited. Dr. Cahn has lessened his burden by having a brief introductory section to each subject considered, in which he reviews the normal histological structure before describing the pathological changes.

The illustrations are largely microphotographs and so the text is of greatest value for use in conjunction with the microscopic and pathological slides. They, as well as the clinical photographs, are well chosen, clearly reproduced and excellently co-ordinated with the text.

Concise case histories are given which enhance its value for graduate and undergraduate teaching and also help to make it more readable than most books on this subject.

BOOKS RECEIVED

What Price Alcohol. R. S. Carroll. 362 pp. \$3.00. Macmillan, Toronto, 1941.

Proctology for the General Practitioner. F. C. Smith. 2nd ed., 466 pp., illust. \$4.50. F. A. Davis, Philadelphia, 1941.

Anaerobic Bacteria and Their Activities in Nature and Disease. Subject Bibliography. L. S. McClung and E. McCoy. Supp. 1, 244 pp. Univ. of California Press, Berkeley, 1941.

Students' Pocket Prescriber. D. M. Macdonald. 11th ed., 314 pp. 3s. 6d. E. & S. Livingstone, Edinburgh, 1941.

The New International Clinics. Vol. 2, Series 4. Edited by G. M. Piersol. 299 pp., illust. \$3.00. J. B. Lippincott, Montreal, 1941.

Acrocephaly and Acrocephalosyndactyly. D. Ferriman. 119 pp. \$3.50. McAinsh, Toronto, 1941.

Annual Review of Physiology. Edited by J. M. Luck. Vol. 3, 784 pp. \$5.00. Annual Reviews, Stanford University, Calif.

